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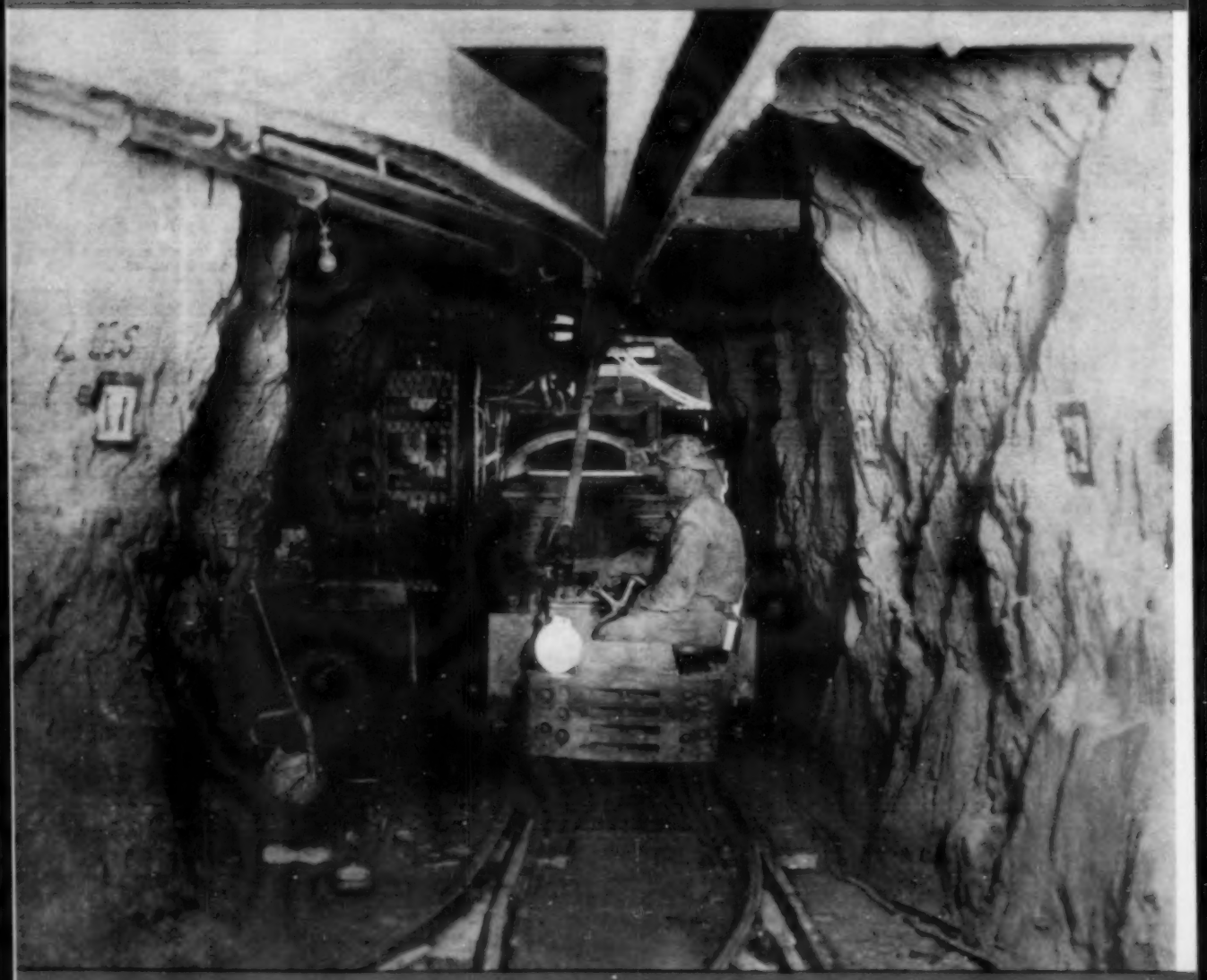

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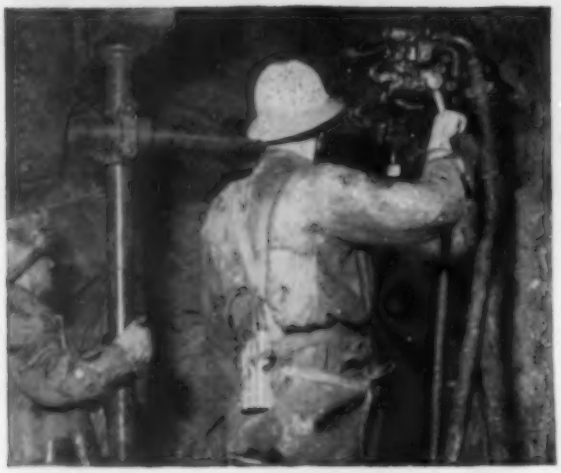

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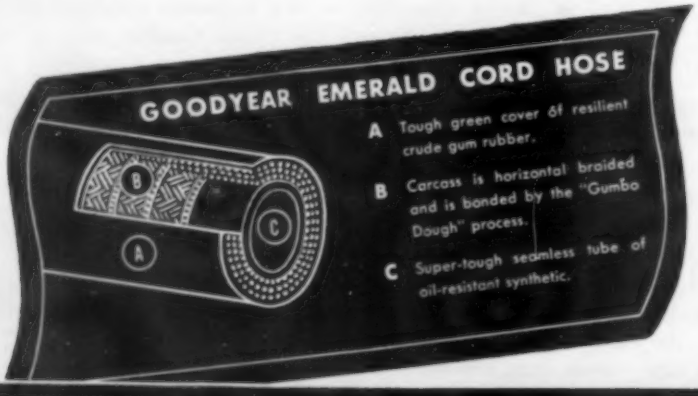
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On the cover

Underground transportation at the Hollinger Mine, Ontario.

—Canadian National Railways Photo.

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R. H. G. Bonnycastle

MANAGING DIRECTOR:
Arthur H. Strock

EDITOR:
C. W. Marchant

MANAGING EDITOR:
F. W. Tees

CIRCULATION DIRECTOR:
W. S. Hamilton

ADVERTISING MANAGER:
L. O. Thompson

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Eastern Offices
Toronto: 77 York Street; Phone Empire 6-3723
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The Sherritt Gordon Lynn Lake Project

UNDER the title of the Sherritt Gordon Lynn Lake Project five papers were read at the annual meeting of The Canadian Institute of Mining and Metallurgy held at Toronto April 18th to 20th. Eldon L. Brown, president and managing director, spoke on Discovery and Financing; G. D. Ruttan, chief geologist, Geology of Lynn Lake; J. R. Muter, mine superintendent, Mining at Lynn Lake; R. T. Drake, flotation research engineer, Milling at Lynn Lake; and Sydney Nashner, manager, chemical and metallurgical division, Refining at Fort Saskatchewan.

In his paper, Mr. Brown traced the history of the company from its formation in 1927 to acquire and develop a copper-zinc deposit at Sherridon, some 100 miles north of The Pas in Northern Manitoba. After the deposit had been explored by diamond drilling and underground work, and some 5 million tons of ore in two orebodies had been proved, he said, the Canadian National Railway constructed a 42-mile railroad to connect the mine with their Flin Flon branch at Sherritt junction. By September 1951 the orebodies became completely exhausted.

Deep diamond drilling having indicated early that the life of the mine was limited, search for a new mine was started in 1937 in the belt of greenstones and sediments located to the north of Granville Lake, some 100 to 150 miles north of Sherridon. By the end of 1940 no discoveries of economic value had been made. In September, 1941, Austin McVeigh, one of the company's prospectors, who had been prospecting in the area since 1937, noticed rust stains on a small rock knoll about half a mile north of a little lake which had been called Lynn after Lynn Smith, one of the company's engineers. Assay of samples sent to Sherridon showed less than 1 per cent of copper, better than 1.5 per cent nickel and no precious metals. Though the discovery was not economic it proved the presence of nickel mineralization in the area.

Evidence of Nickel-Copper

McVeigh camped on Ralph Lake, 3½ miles to the west of Lynn Lake, in 1943 and located three weak and irregular anomalies to the north of Lynn Lake and a very strong magnetic anomaly extending from the centre of the east side of Ralph Lake in a northeasterly direction to Barbara Lake. Being in low wet ground it could only be investigated by diamond drilling, but by the end of 1943 there was definite evidence of nickel-copper mineralization, three quite weak and irregular and one quite strong and of major proportions.

No further work was done in the Lynn Lake area until April, 1945, when McVeigh did further detailed magnetometer work on the big anomaly in sections where the swamp was too wet to work in the summer time. Review of the situation after breakup led to the decision to stake a group of claims extending from Ralph Lake to the west to the Keewatin river and Elson Lake on the east, an area approximately six miles square, which was mostly swamp and drift covered, and would take in all the known magnetic anomalies and also McVeigh's original nickel-copper find north of Lynn Lake. It was also decided to fly a diamond drill outfit in from Sherridon to drill the big anomaly at Ralph Lake.

Three holes were drilled to investigate three different magnetic highs in the big anomaly and in every case the anomaly was found to be due to lenses of magnetite in quartzite. The third hole having been completed on August 17, it was decided to move the drill over to Lynn Lake to investigate the weak anomalies which had been picked up there in 1943.

Discovery Leaks out

Drilling started there on September 3 on the best looking of the three anomalies. The hole was drilled to a depth of 470 feet and showed sparsely disseminated sulphides, chiefly pyrrhotite with a little chalcopyrite, much below ore grade. A second hole 250 feet to the north encountered very bad caving conditions and was abandoned on September 20. The drill was moved 100 feet to the west to drill a vertical hole in the anomaly.

Later, said Mr. Brown, "it became obvious that the second hole had been following the upper "A" fault and if it had been continued it would have gone under the Upper "A" orebody and over the Lower "A" orebody. The vertical hole located the Upper "A" orebody giving an intersection of obviously good grade ore. This hole was completed at a depth of 445 feet on September 26th."

Freeze-up proving unusually slow that year, an additional five weeks was allowed free of staking competition, but by the time flying on skis had started again the discovery had leaked out and there were many staking parties waiting at Sherridon and Flin Flon to get in to Lynn Lake.

"The discouraging results of the drilling at Ralph Lake," said Mr. Brown, "had changed our original staking plans, and apart from the original group of 28 claims all of our staking was designed to cover as much as possible of the known basic intrusives. By the time we were completely hemmed in by outside staking, in 1946, we had acquired a total of 344 claims in a block approximately 10 miles long and from 2 to 3 miles in width. This was somewhat short of our original objective, but we were lucky in that our ground took in all the nickel deposits which have so far been discovered in the area."

"The development of the Lynn Lake orebodies was more or less routine. Geophysical surveys, both magnetic and electro magnetic, located all the sulphide deposits which came within two to three hundred feet of the surface. One or two diamond drill holes in each anomaly were sufficient to determine whether or not the sulphides were nickel bearing. The nickel-copper deposits were then outlined by closely spaced diamond drill holes, followed in most cases by subsequent underground development work. The finding of the high grade "El" orebody in January, 1947, was really the turning point in the development of the mine."

Laboratory scale flotation test work on Lynn Lake ore started in 1946, using sample rejects from diamond drill core, and in 1947 a pilot flotation plant was operated at Sherridon on ore which was quarried in an open pit on the Upper "A" orebody. A 25-ton per day pilot flotation plant was erected at Lynn Lake in 1948 and operated in 1949, 1950 and 1952 on ore taken out in the course of underground development.

Ammonia Leaching Process

In 1947 a step was taken which led to the development of the ammonia leaching process, resulting in better metal recoveries and lower operating costs than given by the conventional smelting and refining methods used in the Sudbury area. Prof. Frank A. Farward, of the University of British Columbia, was retained to work on Lynn Lake massive sulphide stringers follow this pattern. The presence of the large mass

concentrate and in 1948 was successful in discovering and developing on a laboratory scale a process which looked promising. Using data supplied by Prof. Forward, a research man duplicated the results in the laboratory at Sherridon.

Chemical Construction Corporation were retained to design a pilot plant for the process, which was built in Ottawa and put into operation in 1949, treating nickel concentrate produced in the pilot flotation plant at Lynn Lake. Results were encouraging and the plant was rebuilt in, 1950, 1951, and again in 1952 as operation developed changes and improvements in the process.

"The 1952 plant," said Mr. Brown, "was as nearly as possible a small scale replica of the commercial plant, which was being built at Fort Saskatchewan, and was operated with a view to finding and eliminating 'bugs' which might develop in the commercial plant and also to train a crew of key operators for the Fort Saskatchewan plant."

Mr. Brown, in paying tribute to the work of New Canadian engineers and scientists in the development of the leaching process, said that at one time the staff at Ottawa included representatives of 22 different nationalities.

Financing The Project

Mr. Brown proceeded to discuss the steps that were then taken to secure the money required for the provision of the necessary production facilities. "In our case in addition to mining, milling and refining facilities, a hydro-electric power development and a 150-mile railroad were also necessary before the mine could go into production."

The firm of Ford, Bacon and Davis Incorporated of New York was engaged to give an independent engineer's report in view of the size of the project and the fact that a new and rather unique process was to be used in the treatment of the nickel concentrate. The Battelle Memorial Institute of Columbus, Ohio, was retained in an associate capacity to study and report specifically on the ammonia leaching process. Sales contracts covering the entire nickel output and 60 per cent of the cobalt and copper output for the first five years of production were made with the U.S. Government and four of the larger nickel consumers among U.S. steel producers. Assurance was given by the government at Ottawa and the Canadian National Railways that a railroad would be built if it could be shown that the operation would have a minimum of 20 years life and that sufficient money would be available to ensure provision of the necessary production facilities.

Efforts to secure the backing and endorsement of the larger Canadian mining companies was unsuccessful and finally the Newmont Mining Corporation of New York, after making an examination of the mine and a study of the data on the new leaching process, agreed to assist in financing the project.

In 1951 the capitalization of the company was increased to 12,000,000 shares and 2,188,886 shares were sold at a price of $2 per share, netting the treasury $4,340,000. The share holders bought 1,066,690, the Newmont Corporation buying the balance. In 1952 a financing plan was worked out with Newmont, J. P. Morgan and Co. Inc. and eleven other banks and insurance companies.

Total cost of the Lynn Lake project was estimated at $35,029,000, exclusive of the value of the plant and buildings transferred from Sherridon. Working capital requirements and provision for a general contingency reserve increased the total financing required to $41,165,000. Of this amount $10,825,000 had been provided by earnings from the Sherridon mine and $4,340,000 had been provided by the sale of shares in 1951.

The financing plan designed to provide the remaining $26,000,000 included: $7,000,000 to be provided by Newmont in return for $7,000,000 principal amount of debentures, to be non-interest bearing and convertible into Sherritt Gordon shares at $2.50 per share up to June 1, 1956, thereafter to bear interest at the rate of 5 per cent per annum and to be non-convertible, maturing December 31, 1951; $3,800,000 (U.S. funds) to be obtained by the sale of Series A first mortgage bonds at par to the banks and insurance companies; $15,200,000 (U.S. funds) to be obtained by the sale of Series B first mortgage bonds at par to the banks and insurance companies, Series A bonds to bear interest at the rate of 4 per cent per annum and to mature in eight equal quarterly installments commencing Nov. 1, 1954, and Series B to bear interest at the rate of 4¾ per cent per annum and to mature in 32 equal quarterly installments commencing Nov. 1, 1956.

If further money were needed to complete the program a further $800,000 of Series A bonds and $2,200,000 of Series B bonds were to be purchased 50 per cent by Newmont and 50 per cent by the banks and insurance companies.

Refinery Costs Exceed Estimates

Late in 1953, said Mr. Brown, it became apparent that the refinery at Fort Saskatchewan would not be completed on schedule and that the actual cost of the plant would be greatly in excess of the estimated cost. A revised estimate of the overall project raised the total cost to $46,799,000, an increase of $11,770,000, of which $7,149,000 was applicable to the cost of the Fort Saskatchewan plant. In addition provision had to be made to cover the cost of operating the mine from eight to ten months until the refinery was in production on a fairly substantial scale.

An amendment in the contract for the sale of nickel to the U.S. Government provided for advance payments on the purchase price of the nickel content of concentrate from Lynn Lake stockpile at Fort Saskatchewan during 1954. A supplementary financing agreement was worked out with Newmont Mining Corporation, J. P. Morgan and Co. Inc. and the other banks and insurance companies.

Concluding his paper, Mr. Brown said that it was just under nine years from the discovery of the first ore body at Lynn Lake on Sept. 22, 1945, until the first shipment of nickel metal left Fort Saskatchewan on August 7, 1954. He paid tribute to the staff and crew who specialized in removing obstacles and worked enthusiastically to make what seemed to be little more than a dream—namely the creation of a third fully integrated Canadian nickel producer—into a reality.

GEOLOGY OF LYNN LAKE

IN HIS PAPER on the Geology of Lynn Lake, G. D. Ruttan, chief geologist, made these concluding observations:

"There are six orebodies situated within the "A" plug, near its western edge. Each of these orebodies is designated by one of the following letters: A, B, C, E, F and G.

"A" Orebody

"The "A" orebody is the most important of the group. The main shaft is situated here, and the "A" orebody is the only one of the group that has been developed for mining. It is a disseminated sulphide-type deposit, and contains 4,975,000 tons, averaging 1.22 per cent nickel and 0.64 per cent copper. Cobalt is present in small amounts.

The orebody is irregular in outline, with its length and width approximately equal. It varies in shape and size, both horizontally and vertically. In vertical section, the ore consists of a series of blocks of mineralized amphibolite between steep west-dipping thrust faults. Pressure on the faults from a westerly direction resulted in a series of north east-south west tension fractures and breccia zones. Minor acid dykes and

of competent quartz hornblende diorite was probably a factor in localizing the actual point of failure of the block under pressure. Irregularities in strike and dip of the faults, which may in turn be related to the presence of the quartz hornblende diorite were very likly an additional factor in determining the point at which the amphibolite shattered.

"The grade of the ore is directly proportional to the intensity of brecciation, with the highest grade material originating at or near one of the faults, and extending toward the next fault. The ore grades laterally outward to an arbitrary ore limit, and often spreads out, or bulges, as it approaches a fault, so that it reaches its greatest size along the fault.

"The sulphides replace all types of silicate minerals within the fracture zone, assuming the grain size and texture of the rock replaced. Minor structures, such as drag folds, are preserved in the replacement process. Very high grade specimens of pentlandite are obtainable in breccia zones or from pentlandite stringers, where, by careful selection, assays up to 32 per cent nickel have been obtained.

"C" Orebody

"The "C" orebody is situated about 600 feet north of the "A", and is controlled by similar structures. It consists of 760,000 tons, averaging 0.77 per cent nickel and 0.50 per cent copper.

"It occurs near the margin of the same mass of quartz hornblende diorite as the "A" orebody, and is irregular and pipelike. It also consists of a series of blocks between faults. The "C" orebody is primarily a stockwork of irregular sulphide stringers. Mineralization here has followed a much coarser fracture pattern, and replacement has not proceeded to the same degree as at the nearby "A" orebody. The host rock is generally the harder, more feldspathic variety. Heavy sulphide masses are present to a more limited extent than in the "A", within similar breccia zones.

"The crushing effect from the more widely spaced and more widely divergent faults associated with the "C" orebody has apparently been considerably less, with the result that the orebody is more erratic, and of lower overall grade than the "A". Minor offsets, noticeable only where small acid dykes have been faulted, usually have a sulphide-filled slip plane. Residual fragments in beccia zones include amphibolite, diorite, quartz hornblende diorite, fine grained silicious material (felsite) and granite. The fragments may be either unmineralized or in various stages of replacement.

"The ore in the "C" area is controlled by relatively widely spaced faults near the contact of the quartz hornblende diorite mass. When the faults become too widely spaced, or leave the contact area, fracturing, together with the ore, dies out abruptly.

"B", "E", "F" and "G" Orebodies

"These orebodies are similar in most respects to the "A". They are bodies of disseminated sulphides in amphibolite and diorite between premineral faults. They are situated near the west boundary of the plug, south of the "A" orebody. The "B" orebody is the southernmost, at a distance of 4,000 feet from the "A".

"These orebodies have been explored by diamond drilling, and by drifting on the 1,000-foot level. Details on their structure are therefore lacking.

"The "B" orebody is the largest of the group, containing 4,275,000, averaging 0.74 per cent nickel and 0.50 per cent copper. It also consists of a series of blocks between faults with mineralization extending between them either as a solid mass, or in several zones, which, grouped arbitrarily, constitute the orebory.

The "E", "F" and "G" orebodies comprise 1,600,000 tons, with an average grade of 0.79 per cent nickel and 0.43 per cent copper.

MINING AT LYNN LAKE

W. R. MUTER, mine superintendent, in his paper, said that the two orebodies, currently in operation, the "A" and the "E1", are about two miles apart and mined as separate units. Figures for the year 1954, giving some idea what has been accomplished, include the work done at both mines. The "A" mine did not approach full tonnage until about April and the "E1" mine did not produce regularly until May: Hoisted, 560,000 tons; broken, 623,523 tons; drilled ready to blast, 269,280 tons; blasthole footage, 310,908 feet; drifting, 6,334 feet; raising, 2,279 feet; tons per man shift, underground, 16.03 tons; tons per man shift, payroll, 5.41 tons.

The "A" mine is operated at 1,500 to 1,700 tons per day, and the "E1" mine at 500 to 800 tons per day, said Mr. Muter. "The "E1" ore is high grade and is mixed with ore from the lower grade "A" mine to give the mill as uniform a feed as possible. The orebodies in general lend themselves to a very simple mining operation. They are pipelike and nearly vertical with good wallrock conditions. An open stope, sublevel mining method is used. The sublevel interval is 75 feet. Stoping is by the long-hole ring-drilling system, with rings drilled from drifts or crosscuts. Scrams are used to handle the broken ore discharging through ore passes directly to a jaw crusher. The crusher discharges to a conveyor belt and this in turn into the shaft ore pocket".

The two mines are operated with a total crew of 135 men, distributed as follows: supervision, 9, five at "A" and 4 at "E1"; development, 29, 17 at "A" and 12 at "E1"; exploration, 6, 4 at "A" and 2 at "E1"; blasthole, 20, 14 at "A" and 6 at "E1"; scrams, 18, 14 at "A" and 4 at "E1"; crushing and hoisting, 22, 14 at "A" and 8 at "E1"; general 18, 10 at "A" and 8 at "E1".

Labor relations are excellent, says Mr. Muter, with a very low labor turnover, All underground work, wherever possible, is on a contract basis. In all cases, except the scrams, the contract covers cost of labor, explosives, diamonds and tungstem carbide bits. Scram contracts are based on tonnage with 50 per cent of the explosives charged to the contract. Crushermen and skip-tenders participate in the scram contract on a 50 per cent basis.

In conclusion, Mr. Muter said: "Production mining has been going on for just over a year. Refinements in the operation are only now becoming possible. It is hoped and expected that costs can be improved in the next year."

REFINING AT FORT SASKATCHEWAN

MR. NASHNER, in his paper, said that the metal refining process is divided into the following six sections: (a) leaching; (b) copper separation; (c) unsaturated sulphur oxidation and sulphamate hydrolysis; (d) nickel metal reduction; (e) cobalt recovery; (f) ammonium sulphate recovery.

"One of the more important factors contributing to the success of the refinery start-up operations", said Mr. Nashner, "was the training of some 75 engineers and operators at the Ottawa Pilot Plant. These men, together with key members of the Research Laboratory group, formed an invaluable operating and problem-solving group for the refinery start-up work.

"In addition to the availability of the above training and background, plans were prepared to start up a single refinery unit at a time. For example, the first leaching operation carried out on May 24, 1954, involved only a batch operation in one cell of the adjustment leach autoclave. This operation having been satisfactory, and with operating confidence built up, a batch reaction was carried out with the autoclave completely filled. The single reacted, filled auto-

clave was then placed on continuous stream, discharging and filling the adjustment thickener. This first continuous operation involved only a limited area of the Leaching Plant and allowed for the close supervision and control required in the uncertainties involved in a new operation. As operating confidence and experience were built up, and errors and defects were corrected, additional units were started up at increased feed rates. By June 30th, the entire leaching circuit was filled. Sufficient quantities of purified leach liquor were available for the start-up of the Metals Recovery Plant on July 13th. The first nucleation plant was successfully carried out on July 21st, 1954. The first day's production amounted to approximately 6,000 pounds and was up to specification.

"Numerous problems, of course, remained to be solved after this first day's production. Progress was reasonably steady, however, and operations approached 90 per cent capacity by the close of the year.

"In general, the chemical process results obtained in the refinery followed closely those in the Pilot Plant. In general, all the autoclave operations developed favorably, based on the scale-up factor used. Since the Pilot Plant operated at a concentrate feed rate of 3,000 pounds per day, it would appear that for continuous chemical reactions of the type used in this process a continuous pilot plant data scale-up approximately 150 fold is satisfactory for design purpose. Emphasis is placed, however, on continuous, fairly long term, pilot plant operation. An examination of published batch data on leaching operations compared with current operations emphasized the risks involved in using such unmodified data for scale-up purposes.

"The information on corrosion rates developed in the Pilot Plant has been found satisfactory for design purposes within the limits of the relatively short operating experience. Corrosion rates of a few thousands inches penetration per year found in our stainless steel Pilot Plant autoclaves appear to be substantiated at the refinery. It has also been found that ordinary carbon steel has corrosion resisting properties close to Class A material for cold process liquors.

"Insofar as physical and mechanical factors are concerned, the scale-up and predictions were not as favorable. Several items of equipment, such as mechanical seals, agitator impellers, let-down valves, thickeners and filters, initially installed at the refinery, did not give the service life or did not perform as well as predicted in the Pilot Plant. This is particularly true in equipment subject to severe erosion, such as high pressure let-down valves. Considerable mechanical development work had to be undertaken by our own staff and those of equipment manufacturers to improve such equipment as appeared unsatisfactory".

Start $6,000,000 Pronto Plant in Production

Left to right, Joseph H. Hirshhorn, New York and Toronto financier, Paul E. Young, mine manager, Franc. R. Joubin, geologist, and William H. Bouck, president of the company, have all had a hand in bringing Pronto Uranium Mines Ltd. into existence and into early production. They are seen at the moment of pressing the button which whirred the huge $6,000,000 plant into production at an informal ceremony, August 28th. Pronto is located in the Blind River district of Algoma region, Ontario.

Large Nickel Area Found By Inco In N. Manitoba

AN aerial survey by International Nickel Company has revealed what appears to be another large nickel-bearing area some 40 miles north of the big deposits staked previously by the company in the Mystery Lake-Moak Lake area. It is stated that some 500 claims have been staked by the company.

The earlier discovery at Mystery Lake is estimated to contain about 50 million tons of 0.5 per cent nickel. The company announced early this year that it was sinking a 1,300-foot shaft, which, with lateral drilling, would cost in the neighborhood of $2,000,000.

If the new location proves to be as valuable as that of Mystery Lake, another major nickel region in Northern Manitoba appears to be in the making.

DALE L. PITT, MINING ENGINEER, WELL-KNOWN IN B.C., DIES

Dale L. Pitt, mining engineer resident in Seattle, but most of his career connected with B.C. operations, died at his home on September 13. Mr. Pitt had resigned as managing-director of Silbak-Premier Mines Ltd. last spring. After graduation from the University of Utah he became associated with American Smelting and Refining Ltd. In B.C. he managed the Premier Mine for that company.

New Production, Drilling, Refining Records Seen for Manitoba Oil Industry

By LESLIE ORR ROWLAND, Editor, Oil in Canada

ALTHOUGH the wildcat drilling activity in Manitoba dropped to a very low ebb in the latter part of August and through most of September, completions of development wells soared as important extensions in the Virden area brought an intensive drilling campaign to a new height. The increased rate of development drilling was reflected in production figures for July, the latest month of official record, and in the considerably higher figures for current receipts of crude oil in the Trans-Prairie pipe line in the first half of September.

July production amounted to 396,001 barrels, an average of 12,774 barrels per day, bringing the 1955 cumulative production to 2,030,457 barrels for seven months and the alltime cumulative since start of production in 1951 to 4,953,419 barrels. The alltime cumulative passed five million barrels during the first week of August, with every prospect that the full year 1955 will exceed four million barrels by a comfortable margin and raise alltime cumulative to more than seven million.

This beautiful new process unit at the Brandon refinery of Anglo-Canadian Oils Ltd. is the 1,000 barrels per day Platformer, designed by Universal Oil Products Company, which went on stream this summer to upgrade the quality of Anglo's high octane motor gasoline.

Double 1954 Production

According to the monthly report of the Mines Branch, Department of Mines and Natural Resources, the July 1955 production total continued to rank double the same month of 1954 and the seven-month cumulative total was slightly more than double production for the same 1954 period. The comparative figures for last year were 198,024 barrels in the current month and 985,029 barrels for seven months. The rate of well completions and the persistent good weather, which made it possible to continue connecting batteries to the pipe line system all summer, indicate that the rate of double 1954 production is likely to be carried through to the end of this year. As the market approaches saturation, of course, this curve will flatten out, but production is expected to stay at a high level for as far ahead as it is possible to forecast. New discoveries and extensions of proven fields appear capable of replacing any losses occasioned by older wells becoming depleted.

The changing distribution of production among fields was emphasized again in July, as the Virden-Roselea field was in top position for the second time in succession. Its production of 144,972 barrels or 4,677 barrels per day was up 10 per cent from June and 135 per cent from July last year. Its 1955 total for seven months was 722,229 barrels and alltime cumulative 1,400,935 barrels. The Daly field, veteran in the province, remained in second place with 132,634 barrels or 4,279 barrels per day. This was up five per cent from June and only 16 per cent from July a year ago. The North Virden field, growing at the greatest rate, produced 74,449 barrels or 2,402 barrels per day to score an advance of 20 per cent over June production and 400 per cent over July 1954. The 1955 total for Daly was 829,858 barrels and alltime cumulative 2,756,207 barrels, while figures for North Virden were 288,505 and 450,063 barrels.

3 Major Fields Produce 89%

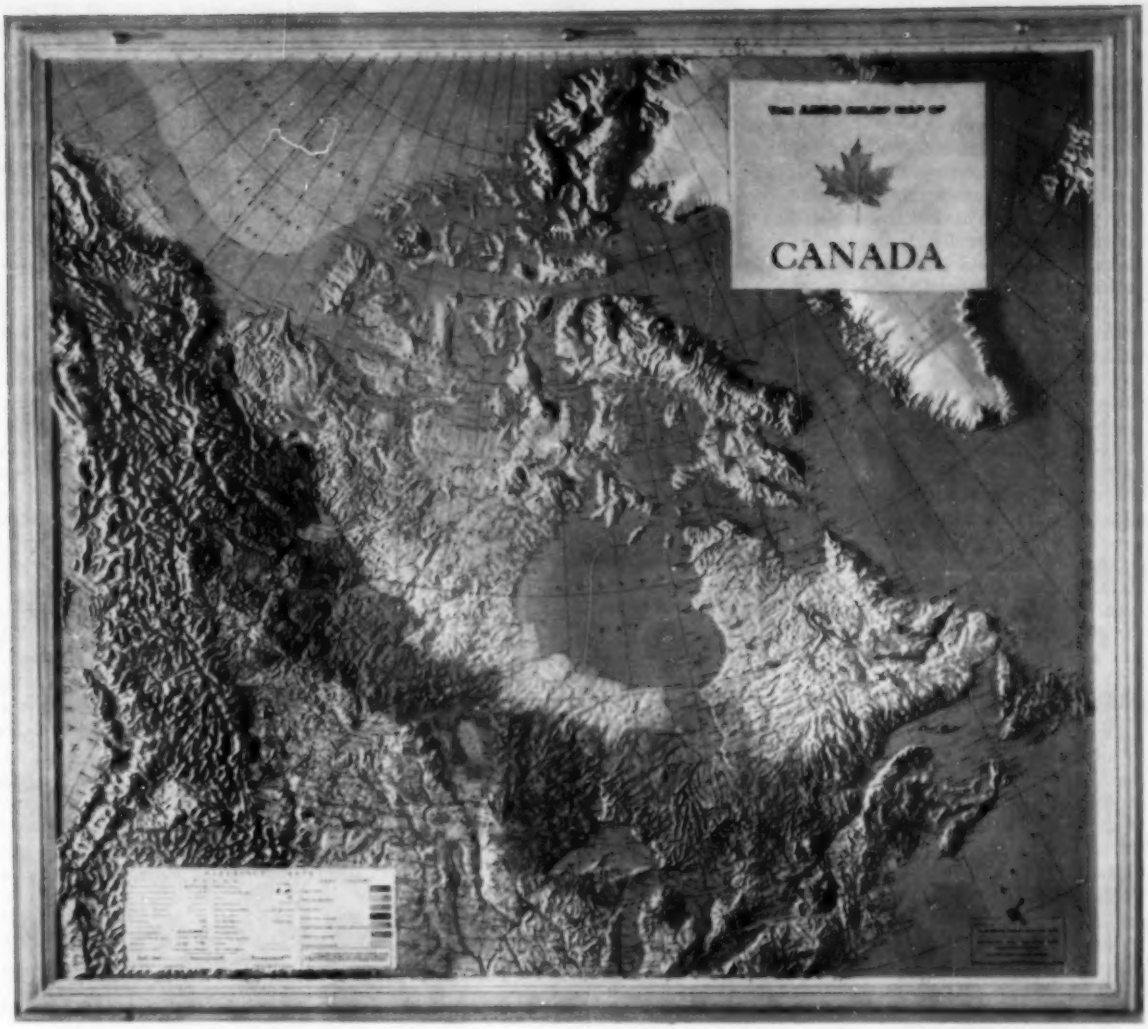
In terms of percentage of the total provincial production, Virden - Roselea had 36½ per cent, Daly 33½ per cent and North Virden 19 per cent. Thus the three major fields among them accounted for 89 per cent of the entire Manitoba production. Last year the proportions had been 58 per cent for Daly, 29½ per cent for Virden-Roselea and one per cent for North Virden, or a combined total of just about the same proportion of the provincial total.

The minor fields showed little progress as most of them appear to have been fully developed. Woodnorth produced an average of 613 barrels per day, Pierson 252 barrels per day, Ebor 152, Whitewater 95, Tilston 76 and Lulu Lake 49 barrels per day.

Among companies The California Standard Company continued to hold first place by a wide margin, producing 197,300 barrels or 6,365 barrels per day for more than 50 per cent of the total. It drew production from 188 wells. The British American Oil Company Limited and Union Oil Company of California, operating in partnership, produced 50,404 barrels or 1,626 barrels per day from 40 wells to take second place with 12½ per cent of the total. In third position was Canadian Superior Oil of California Ltd., producing 35,287 barrels or 1,138 barrels per day from 36 wells. It accounted for nine per cent of total production. Fourth was Imperial Oil Limited with production of 26,727 barrels or 862 barrels per day. Operating 29 wells, it was responsible for seven per cent of the total. With these four companies or teams taking nearly 80 per cent of the provincial pool, the various other operators all had small shares of the remainder.

Good News For Operators

Good news for all the Manitoba operators on the pipe line gathering system was contained in an announcement on September 10 that the tariff on the Trans-Prairie Pipelines Ltd. line would be reduced by two cents per barrel on October 1. In making the announcement, Don R. Brandt, president of Trans-Prairie, explained that the first 12-month operating period had involved expenditure of $650,000 on extensions to the original pipe line system which it took over from Canadian Pipelines and Petroleums Ltd. a year ago and that this work had so enlarged the system that it was able to take advantage of the operating economies going with an increased throughput. Current traffic is over 13,500 barrels per day, he said. This compares with some 8,000 barrels



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per day when the line went into operation last August.

A further item of advantage to the operators was Mr. Brandt's announcement that the company would start immediately to lay more pipe in the North Scallion sector of the North Virden field, where several dozen wells have been brought on production during the summer. The present system, consisting of 20 miles of main 6-inch line and 35 miles of 4-inch and 3-inch laterals, will be increased in size by 10 miles of main line and 10 miles of gathering system. Included in the project, besides the extended gathering system at the north end of the line, is a connection of the main line to pick up oil from the Woodnorth field and the East Cromer sector of the Daly field. Previously dependent on truck transportation and therefore on the uncertainties of the weather, this sector will have weather-proof and year-round transportation for its crude. The comparative economies of pipe line and surface transportation would have been even more conspicuous this summer but for the abnormally dry spell through July and August.

435 Producing at End of July

Operators produced from 406 wells in July, while 29 new oil wells added to the list of producers brought the total capable of producing to 435 at the end of the month. This was the same number of new producers as were added in June.

The number of wells which finished drilling in August was 43, comprising 34 development wells and 9 wildcats, compared with 32 in August 1954 which consisted of 13 wildcats and 19 development wells. The comparative figures indicated the tremendous upward swing in development completions and the comparable decline in wildcats. Cumulative totals for the eight months were 184 development wells, a rise of 65 per cent over 1954, and 40 wildcats, a decline of 10 per cent. Development wells which finished drilling in August surpassed the record totals of 33 and 32 set last December and October respectively, and by the middle of September it was evident that the year's total will be greatly increased over 1954, probably to at least 350 or 360 wells for a gain of 10 to 15 per cent.

The Virden-Roselea field accounted for 66 new development wells in the eight-month period and North Virden for only 45, but during the three months of June, July and August the trend was exactly reversed from the first five months, with North Virden completions jumping to 27 and Virden-Roselea declining to 14 as the play moved farther north into the Scallion sector.

A welder working on attachment of scratchers to the casing string for a new oil well in the North Scallion sector of the North Virden oil field in Manitoba illustrates the speed with which new wells are being completed in this field, most prolific in the province in 1955.

No oil discoveries were made in August or in the first two-thirds of September. Only two wildcat dry holes finished drilling in the second half of August. Rio Prado Consolidated Oils Limited completed as a dry hole its Rio Prado-Souris Valley Downey 12-9 well, lsd 12-9-1-27WPM, on a farmout from Souris Valley Oil Co. Ltd. It was abandoned at total depth of 3,570 feet (2,060 feet subsea). The second venture of United States Smelting, Refining & Mining Company met with the same fate as its first earlier in the month. U.S. Smelting Draper 3-30, lsd 3-30-5-21WPM, ground elevation 1,522 feet, was completed and abandoned at total depth of 2,651 feet (1,115 feet subsea) by contractor Moore Drilling Co. Ltd. Its location was two miles northeast of the Souris Valley Warnez 5-13 dry hole.

Large New Wildcat Program

In early September Cleary Oils Limited started on a large new wildcat program, most of it on a farmout from Souris Valley Oil Co. Ltd. The first well was Cleary Rowbottom 3-19, lsd 3-19-5-29WPM, ground elevation 1,661.96 feet, which finished drilling at total depth of 3,790 feet (2,120 feet subsea) and was abandoned. Its site was two miles south and one mile west of the Tilston oil pool but separated from it by a dry hole at the south end of the producing area.

Six other wildcats were staked during the first three weeks of September on the Souris Valley farmout. All in the extreme southwestern corner of the province, they will be drilled in rotation with the single drilling rig which Cleary is using on all its Manitoba program.

The first well to be started was Cleary Souris Valley Hallam 15-5, lsd 15-5-1-29WPM, ground elevation 1,565.40 feet. It is three miles southwest of the Poplar et al Antler 1 dry hole and only a mile and a half east of the Saskatchewan boundary.

Cleary Souris Valley Peryl 8-15, lsd 8-15-2-24WPM, ground elevation 1,629.28 feet, is in virgin territory at least seven miles from any previous well in any direction. The Dakota Cassan 5-23 abandonment is 7½ miles north by west; The Anglo-Souris Valley Meggison 10-14 dry hole is eight miles southwest; Souris Valley-Anglo Canadian McKee 15-1, a dry hole, is nine miles northwest and the nearest dry holes to the northeast and southeast are 12 miles away.

Cleary Souris Valley Innes 4-17, lsd 4-17-3-27WPM, ground elevation 1,517.98 feet, is two miles northwest of the Anglo American Skelton 14-4 dry hole and 2½ miles east of the Rio Prado Souris Valley Gibson 2-14 dry hole. It is nine miles northeast of the main producing area in the Pierson field.

Cleary Souris Valley Tingey 11-13, lsd 11-13-1-28WPM, ground elevation 1,472.42 feet, is a mile and a quarter east of the Gordon White 1 wildcat drilled in 1949 by Souris Valley and abandoned after getting traces of oil in drillstem tests. It is two miles southwest of the Souris Valley Robert Moore 1 dry hole and four miles west by north of the group of dry holes drilled by Souris Valley, Pascar Oils Ltd. and Great Northern Carbon and Chemical Company around Coulter.

Cleary Souris Valley Jones 16-5, lsd 16-5-4-27WPM, ground elevation 1,533.61 feet, is six miles west by south of the Imperial West Brenda 13-17-4-26 dry hole, 3½ miles south by east of the Anglo American Coates 20-13 dry hole and six miles west by north of the Cleary McCallum 4-32 dry hole. It is 3½ miles west of Melita.

The sixth well in this program, Cleary Souris Valley White 5-34, lsd 5-34-1-29WPM, ground elevation 1,581.26 feet, is 7½ miles south of the Pierson field, 3½ miles north by west of the Poplar et al Antler 1 dry hole, five miles south by east of the Cal-Standard Pierson Province 2-29 dry hole and six miles southwest of the Rio Prado Souris Valley Hill 16-9 dry hole.

Also completed as a dry hole in September was an extension well in the Hargrave area. A mile north of the commercial oil discovery well, Dome Naco Hargrave 2-13, which finished drilling in July, the McCarty & Coleman part-

nership drilled as a dry hole its McCarty & Coleman Foster 3-24, lsd 3-24-11-27WPM, ground elevation 1,557 feet, was completed at total depth of 2,529 feet (959 feet subsea). Its site is three miles west of the northwest limits of the North Virden oil field and three miles northeast of the non-commercial teaser wells at Hargrave.

The latest wildcat abandonment was the second venture by Great Sweet Grass Oils Limited on its reservation holdings in the Duck Mountain forest reserve, south of Minitonas and close to the Saskatchewan-Manitoba boundary. This well, Great Sweet Grass Sapphire Duck Mountain 2, lsd 2-2-31-25WPM, ground elevation 2,646.8 feet, was located on the top of the mountain, a thousand feet higher than the first well and 23 miles south of it. It finished drilling at total depth of 3,395 feet (738 feet subsea). The Sweet Grass and Sapphire Petroleums Limited team has staked its third location just five miles southeast of this failure. Sweet Grass Sapphire Duck Mountain 3, lsd 16-18-30-25WPM, ground elevation 2,336.3 feet, is also on high ground and will require some 3,000 feet to reach completion depth in the Precambrian basement.

Wildcat Activity At Standstill

All other wildcat activity by the various companies which had been active earlier in the season was at a standstill at the end of September, but one interesting new discovery area was expected to develop encouragingly. This area is the Routledge pool, four miles southeast of the producing limits of Virden-Roselea and apparently separated from it structurally by the Cal-Standard South Virden 1-12 non-commercial discovery of two years ago. The McCarty & Coleman well at Routledge has been offset by another successful completion in the south offsetting site. At the end of September the development pattern was sparked by the staking of Cal-Standard Routledge 15-28, lsd 15-28-9-25WPM, as the east offset to the successful follow-up by Imperial Oil Limited, Imperial Routledge 14-28M-9-25. The geological evidence indicates that the pool may be of at least medium size and may develop into something of the dimensions of the North Virden field.

Less promising towards the end of September was the South Regent pool, discovered by The California Standard Company, in which the latest well to finish drilling was suspended for extensive water intrusion. This well is Cal-Standard South Regent 2-7, lsd 2-7-4-21WPM, the southeast offset to the discovery well.

Secondary recovery made progress in the Daly field, with approval of a program for increased water injection in the southeast corner where the original re-pressuring program has had substantial success. The Oil and Natural Gas Conservation Board granted permission to The California-Standard Company to drill six new wells in Section 11-10-28WPM, into which water will be pumped to stimulate the Cal-Standard Daly 3-12 well and its neighbors.

Production rates from the old 3-12 well have been increased phenomenally by injection of water into four adjacent wells and the new program is designed to carry the secondary recovery into a more extended phase. The production figures for July, latest month of record, show that Daly 3-12 produced 4,378 barrels of oil, or better than 140 barrels per day, to score a total for the month of more than twice the production from most other wells. The Cal-Standard 14-13 well, lsd 14-13-10-28 WPM, a mile and a half north of the 3-12 and also affected by the injection program, produced 3,033 barrels in July.

Cumulative production for the 3-12 well in 1955 to the end of July was 25,787 barrels and its alltime cumulative rose to 105,738 barrels, making it the first and only well to surpass 100,000 barrels cumulative.

In the refining side of the industry, the major event of September was the

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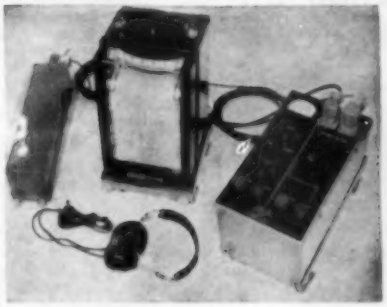

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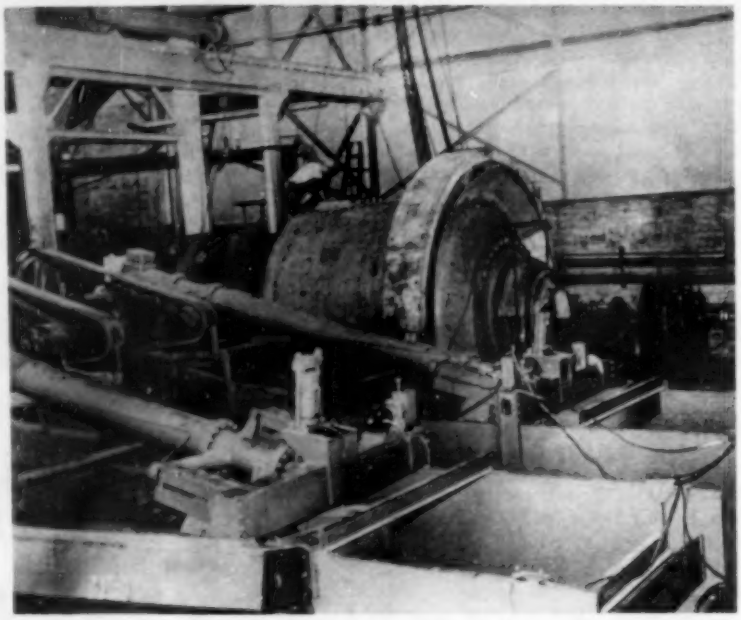
going into full operation of the North Star Oil Limited refinery in St. Boniface. This brand-new streamlined and highly automatic refinery was able to file a nomination for more than 10,000 barrels per day of crude oil for October, close to its rated capacity of 12,000 b/d.

A short time earlier the efficient little refinery of Anglo-Canadian Oils Ltd. in Brandon put on stream its latest unit, a 1,000 b/d Platformer for production of extra high octane motor gasoline. This unit, completed after a construction job which started last fall and was suspended through the winter, will allow Anglo to compete with the larger refineries in the all-important gasoline sales market, with a product quality in the top bracket.

New licenses for wells to be drilled continued to roll along at the rate of 12 a week during September, so that it appeared likely there would be no difficulty in setting a new Manitoba record in all three principal elements, production, drilling and refining, in 1955.

Grinding Area of Pronto Uranium Plant



Grinding area of the Pronto Uranium Mines Ltd. plant is now in perfectly smooth operation, according to manager Paul Young. In the background is one of the 1,000-ton capacity ball mills with the feed end to the left and outlet end, gear reducer and electric motor to the right. In the foreground can be seen the two classifiers. In photo from left to right are Pronto employees, Paul Dean and A. Fortin, at left end and on top of ball mill.

—Photo by The Photographic Survey Corporation, Limited, Toronto.

Saskatchewan Production Up 110.7 Per Cent

Crude oil production in Saskatchewan for the first half of 1955 increased approximately 110.7 per cent over total production for the corresponding period last year.

Saskatchewan's Department of Mineral Resources, in its oil and natural gas report for June, shows in addition to the cumulative figure, a 152.5 per cent increase for the review month as compared to June, 1954.

Oil companies operating in the province during June recovered 930,820.27 barrels for a daily average of 31,027.34 barrels from 996 wells actually operated out of 1,360 wells capable of being operated. The production for June, 1954, was 368,601 barrels from 554 wells actually operated out of 864 wells capable of being operated—or a daily average of 12,286.07 barrels.

The first 181 days of 1955 saw recoverable oil at 4,255,793.56 barrels or a daily average of 23,512.67 barrels. This compares with a daily average of 11,154.36 barrels from a cumulative 2,018,940 barrels for the corresponding period of 1954.

The report also showed that production of natural gas was more than double during June as compared to the same month in 1954, and also more than double for cumulative production since the start of the year.

Gas production for June was 667,810.18 m.s.c.f., as compared to June 1954's 253,464 m.s.c.f., while May's production was 727,281.55 m.s.c.f.

Gross value of crude oil to producers during June was $2,030,653.65 while natural gas value was $20,269.26 gross. The first six months of 1955 saw gross value of crude oil at $7,116,504.22 and $236,954.60 for natural gas. Last June's crude oil had a gross value of $582,891 with cumulative gross value at $3,166,934. Natural gas gross value for June, 1954, was $8,996 and $126,452 for the January to June 30 period.

New drilling records also were set during the first six months of 1955. Highlighting the report was the fact that operators drilled 19.8 per cent more successful completions between January 1 and June 30, than during the same period last year.

Of the 385 wells drilled during the first six months of 1955, 256 were oil wells and two were gas wells. In the corresponding period of 1954 there were 315 wells drilled of which 112 were oil and eight gas.

As of June 30, 1955, there were 1,360 oil wells and 121 gas wells capable of production. This compares with 872 oil wells and 107 gas wells able to produce as of June 30, 1954.

C-I-L WORKERS PRESENT INJURY-FREE PRIZES TO VICTORIA SOLARIUM

The Queen Alexandre Solarium for Crippled Children in Victoria, B.C., has received funds to purchase a new chlorinator from the employees at James Island explosives works of Canadian Industries (1954) Limited.

The money came from individual prizes won by the C-I-L employees for having completed 629 injury-free days or about ½ million manhours without a lost time accident. The prizes won in the C-I-L no-accident record plan, were presented by M. J. Watson, of the company's explosives division, Montreal. The employees voted to turn the award over to the hospital to purchase the chlorinator for the hydrotherapy room.

In setting the record, James Island works qualified employees for the General Manager's prize, one of several under the C-I-L no-accident record plan, and marks the fourth occasion on which the plant has won the award.

Mr. Watson said that although many people think an explosives manufacturing plant is a dangerous place to work, the safety records compiled by such C-I-L plants as the James Island works had proven them to be extremely safe with records above the average.

Nearly 4,000,000 Tons of Ore Indicated at ViolaMac's Manitoba Lithium Property

A PROGRESS report issued by ViolaMac Mines, Ltd., on its Donner-Osis property in the Cat Lake district of Manitoba states that of several lithium (spodumene-bearing) dykes located, only two have been explored in surface exposures and by 32 diamond drill holes, and that they show 2,629,000 tons indicated and 1,321,000 tons inferred, for a total of 3,950,000 tons, with an average grade of 1.281 per cent lithia. ViolaMac's property is 85 miles northeast of Winnipeg, 8 miles from power line, 6 miles from an all-weather road, and 22 miles from railhead.

The two dykes reported on have been named the Main Dyke and the North Dyke. These are the details of sizes and estimates reported by the company:

Main Dyke

Total drilled length, 3,200 feet, open downwards; total ore length, 2,656 feet; average ore width, 10.9 feet; average at $11/unit). Tons per vertical foot, 2,470; tons indicated to drilled depth grade 1.302 per cent Li O ($14.322/ton of 825 feet, 2,037,000; tons inferred to 1,000 feet; total indicated and inferred to 1,000 feet 2,470,000.

Spodumene contains 7.44 per cent lithia, 0.07 per cent manganese oxide; 0.032 per cent iron. Concentrates prepared in bench tests up to 5.9 per cent lithia average 5.2 per cent lithia. Mill tests are continuing.

North Dyke

Total drilled length, 1,160 feet; total drilled depth, 400 feet (Open longitudinally and vertically); average thickness, 14.9 feet; tons estimated per vertical foot, 1,480. Average grade, 1.245 per cent Li O ($13.695/ton at $11/ton).

Tons indicated to 400 feet depth, 592,000, tons inferred to 1,000 feet depth, 999,000, total 1,480,000.

The grand total of the two dykes is 2,950,000 tons, comprising 2,629,000 tons indicated and 1,321,000 tons inferred. The average grade is 1.281 per cent lithia.

The possibilities of increasing reserves are excellent, says the report.

GEOLOGY REPORT ISSUED ON DELHI TOWNSHIP LAKE TIMAGAMI AREA

A geological report has just been issued by the Ontario Department of Mines on Delhi Township, in the Lake Timagami area, where recently there was considerable interest in reports of discoveries of lead, silver and gold.

The report, which was written by K. D. Lawton, one of the Department's staff of geologists, is illustrated by a number of diagramatic maps and plans, and it is accompanied by a full-color geological map of the township drawn to the scale of two inches to the mile. There is also a surface plan of the geology along the main showing of the New Delhi Mines Limited, which carried on development work.

Canada produces about one-third of the world's supply of platinum metals, which are found in the nickel-copper ores of the Sudbury Basin.

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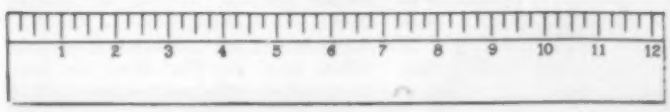

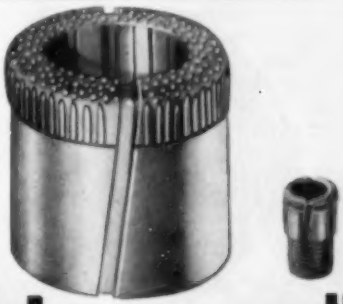

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A Tour of the Gold-Uranium Mines of South Africa

By PAUL E. YOUNG, Manager, Pronto Uranium Mines Ltd.

THE author had the good fortune to make a tour of several of the South African gold and gold-uranium mines during May, 1955. The trip took one month, of which approximately one week was spent in fairly constant travelling, and three weeks in visiting mines in and around Johannesburg.

My first and most lasting impression of South Africa was of its vastness as a country, and of the huge scale of the mining industry in the Transvaal and in the Orange Free State. The scale of mining has recently been greatly increased by the addition of uranium production to that of gold production.

History

Gold was first produced in the Eastern, Western and Northern Transvaal, starting about 1886. The Orange Free State was developed at a much later date, the first shaft commencing in 1946. By 1954, the value of gold produced during the year reached a total of $461,090,968. The total value of gold produced in the Union from earliest records until 1954 was $10,056,-555,300. (Average grade about 0.26 oz./ton.)

In 1949, 44 producing mines in the greater Witwatersrand treated a total of 4,647,621 tons of ore, an average of approximately 3,500 tons per mine per day. Daily production varied from 300 tons/day to 10,900 tons/day. Total working profit for this production was $5,498,395, or $1.18 per ton. The same 44 companies reported ore reserves totalling 165,227,000 tons. Possible life expectancy for the mines, based on these ore reserves, varied from one to forty years.

The figures quoted above for the year 1949 were the latest available for the area as a whole. Present day statistics would far surpass those for 1949, for many new mines have been brought into production since then, especially in the Orange Free State.

Uranium Prolongs Gold Mines

During the past ten years, uranium production has become of very great importance to the gold mines and to the Union of South Africa. At the present time, seventeen gold mines are producing uranium and nine others have been approved as uranium producers. Some of the mines which are now producing uranium were nearing the end as gold producers, but have had their productive lives extended by many years because of the uranium content of their ores. The sales value of prescribed materials, mostly uranium, was $10,844,481 in 1953; this increased to $41,538,963 in 1954, and is still expanding.

The history of the uranium industry in South Africa is comparatively short. The following extracts from a paper given before a joint meeting of the Chemical, Metallurgical and Mining Society of South Africa and the University of the Witwatersrand, on April 28th, 1954, by Mr. C. S. McLean, detail the highlights of the industry's development:

"In 1923, F. Wartenweiler, then assistant consulting metallurgist to the Central Mining Rand Mines Group, initiated an investigation into the mineral constituents of the corduroy concentrates (and the subsequent concentrates) which were then a recent innovation in Witwatersrand metallurgical practice. This investigation was carried out by R. A. Cooper, who read a paper on his findings before the Chemical, Metallurgical and Mining Society of South Africa, in October, 1923."

"In this paper, Cooper reported the presence of the mineral uraninite, but in such minute quantities in the run-of-mine ore that it did not appear to offer economic possibilities and no further attention was paid to the subject for many years. We realize now that the reason for this conclusion is the fact that the uranium mineral found in the conglomerates of the Witwatersrand system is very friable and tends, in spite of its high specific gravity, to be found in the slime rather than in the gravity concentrates which were investigated by Cooper."

One of Largest Low-Grade Uranium Fields

"In 1944, an American geologist, Weston Bourret, while awaiting a visa for Madagascar, paid an informal visit to the Witwatersrand on behalf of the British-American Atomic Energy Organization. It was his secret report on uraninite in amalgam barrel residues that led Professor George Bain, then consulting geologist to the American Atomic Energy Programme, to make his first radiometric examination of two Rand ore specimens in his possession. This, in turn, resulted in a visit to South Africa in 1945 by Professor Bain, accompanied by Dr. C. F. Davidson, of The Geological Survey of Great Britain."

"The first quantitative assessment of the uranium potentialities of the Witwatersrand goldfield in the light of modern requirements was made by these two men and Dr. Davidson's report, in October, 1945, to the Department of Scientific and Industrial Research in London, ended with these significant words:

"Present evidence appears to indicate that the Rand may be one of the largest low-grade uranium fields in the world.'

"The findings of Professor Bain and Dr. Davidson indicated that the uranium present on the Witwatersrand was many times more plentiful than gold."

Reserved to the State

As a result of this report, a commission was set up to evaluate the uranium potentialities of all producing and developing mines, and, at the same time, investigations were started to determine the best treatment methods for the ore. Following these investigations, pilot plants were set up at two plants, Blyvooruitzitch and Western Reefs, in 1949 and 1950 respectively, using a sulphuric acid leach. Construction was started on the first uranium plant in 1951, and the plant started production during 1952.

In South Africa, all prescribed materials are reserved to the State. The Atomic Energy Act, however, permits the State to grant authority to approved mines, to mine and extract prescribed materials, which are classed as any substance containing more than 0.006% U_3O_8, or 0.5% ThO_2.

The price paid for uranium in South Africa is related to the costs of mining and treating the ore. The redemption of capital is also allowed for, over a period of years (generally 10) after the full production rate is achieved.

The mines approved for the mining and treating of uranium ores are located in each of the different mining areas along the producing belt. In some cases, ore from more than one mine is treated at one plant. Many of the uranium treatment plants are treating slime residue from earlier gold milling together with newly mined ore.

General Geology

Uranium, occurring as a mixture of hydrocarbons and pitchblende, is present in most of the many conglomerate horizons in the Witwatersrand formation of later pre-Cambrian age, but production of uranium has, to date, been limited to a few of the conglomerate horizons, namely, the Elsburg Reefs, the Kimberley Reefs, the Bird Reef Series, the Monarch Reef, the White Reef, the Vaal Reef, the Basal Reef and the Carbon Leader which is

near the bottom of the Main Reef Series; the Government Reef and the Dominion Reef Series.

The gold and uranium minerals in South Africa occur in numerous conglomerate horizons in quartzite, in the Witwatersrand formation. In most cases, the immediate hanging wall of the ore zones is quartzite. Some of the newer mines in the Orange Free State, however, have encountered shale just above the ore material and considerable difficulty is being experienced in controlling the back during stoping.

The gold and uranium in South African mines we visited occurs in a quartz pebble conglomerate similar in many respects to the ore horizon in the Algoma District uranium mines.

Brief descriptions of ore material from two different mines follow:

Specimen No. 1:

Pebble Conglomerate: This specimen, for the greater part, is comprised of well rounded pebbles of milky white to grey quartz enclosed in a pyritized gritty matrix. The pebbles, which have an average size of ½", are tightly packed in a fine grained matrix of dark gritty material. The pebbles are commonly fractured and broken. Pebble to matrix ratio is approximately 5 to 1. Visible pyrite occurs interstitially to the pebbles in amounts averaging 3%. For the greater part the pyrite occurs as disseminated grains and bunches concentracted around the edges of the pebbles. The rock has an overall dense appearance suggestive of later silicification.

In general the rock may be described as a well sorted quartz pebble conglomerate with a slightly pyritized gritty matrix.

Specimen No. 2:

Pebble Conglomerate: This specimen is comprised of fairly well rounded, white to grey quartz pebbles, cemented by pyritized gritty matrix.

The pebbles, compared to No. 1, are loosely packed and commonly exhibit some fracturing as well as angular outlines. The matrix material cementing the pebbles is composed of fine to medium grained silts and sand. It is not uncommon to find small rounded rock particles occurring in this matrix.

Pyrite is fairly evenly disseminated throughout the matrix material in amounts up to 10%. Pebble to matrix ratio—60-40.

In general, the rock may be described as a moderately well sorted quartz pebble conglomerate with a well pyritized gritty matrix.

Rand and Algoma Districts Differ

The conglomerate reefs have variable dips, from horizontal to 25-30 degrees. A marked difference between the Rand and the Algoma Districts mines lies in the thickness of the value zones. In the Rand, values are contained in a narrow zone, from a fraction of an inch up to perhaps a foot in thickness, in almost every mine we visited. It was our understanding that this was the case generally throughout the area. This zone usually occurs at the bottom of a conglomerate reef, and stoping widths are as narrow as is practicable. Occasionally, combined uranium and gold values extend over greater thicknesses and we saw one stope where the entire conglomerate bed, approximately 7 feet thick, was being mined for its combined values. In another mine there were areas where two reefs occurred, one on top of the other, and stoping widths reached a maximum of approximately 40 feet.

In the Algoma District, on the other hand, uranium values are normally distributed throughout the entire conglomerate bed, with enrichments in various parts of the bed. The average thicknesses of the ore zones already outlined in the Algoma District are in excess of 8 feet, and thicknesses of 25 to 30 feet are not uncommon. It can be seen that, because of the narrow stoping widths, a great many stopes must be kept in operation in the Rand mines to provide the large tonnages required by the

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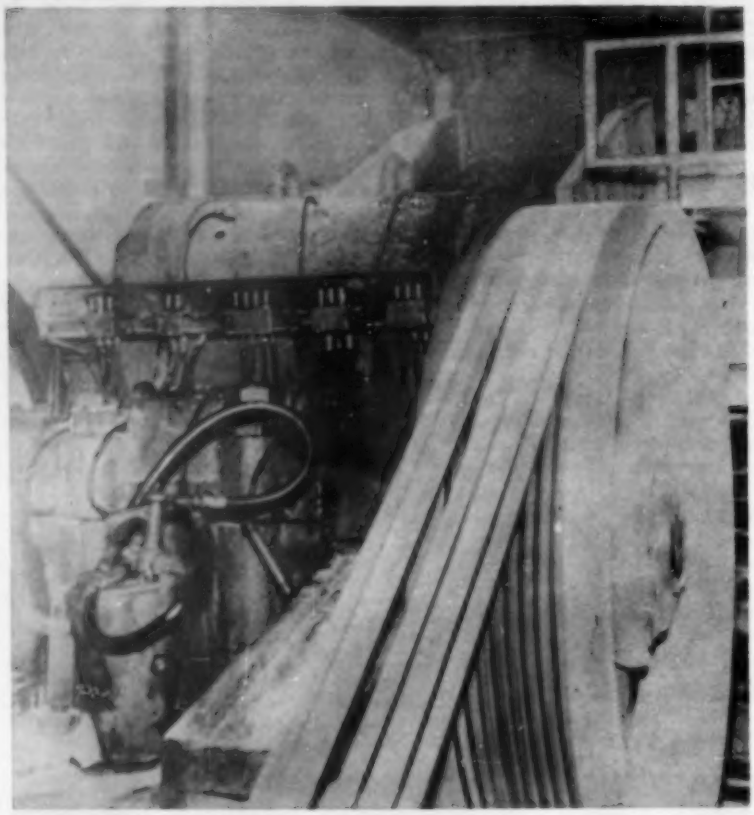

Capable of crushing at least 100 tons of ore per hour is this large jaw crusher shown in operation at the Pronto Uranium Mines Ltd. plant in Algoma, Ontario. In background and near top of picture can be seen endless belt, feeding coarse ore to crusher. The assembly of tubes or hoses located between the large fly wheels of the crusher is part of a forced feed lubrication system.
—Photo by The Photographic Survey Corporation, Limited, Toronto.

mills. This situation is exaggerated even more by the fact that mining is confined to one shift per day.

Exploration and Development

Ore reserve estimates in the Rand are based on results of diamond drill hole intersections sited with a density of about one per square mile. Thus, one drill hole sample represents several million tons of ore. Normally the reef in the Rand is sufficiently uniform in altitude and grade that the ore reserve calculations based on drill hole intersections are borne out reasonably well by subsequent mining. In areas where extensive faulting is present, however, such widely spaced drill holes do not provide sufficient information to permit interpretation of the structural picture.

In the Orange Free State, many of the mines started mill construction simultaneously with shaft sinking, all based on the results of widely spaced diamond drill holes. Several mines are now in production. It has been found in many cases, that the ore zone is heavily faulted, necessitating some changes in mining layout from that originally planned, and, in some cases, faulting eliminates certain sections of indicated ore from the payable ore class. In general, this scheme appears to have worked well, and a large saving has been made in pre-production time and expenditures by starting production many months earlier. This scheme is presently in use in the Algoma District Uranium Mines, where mill construction is taking place simultaneously with mine development.

The staff for one group of mines in the Orange Free State estimated the probable lowest pay limit of the ore zone to be 150 inch dwts. Of 94 exploratory drill holes completed on the properties of seven mines controlled by this group, 22 did not interest the Reef, either because of faulting, entering intrusive rock, caving or other reasons. Of the 72 holes which intersected the Reef, 46, or 63.9% gave values above this pay limit. Shafts and milling plants were started on the results of these drill holes.

Shaft Sinking Highly Developed

Shaft sinking methods in the Rand are highly developed. A mine in the East Rand averaged just over 600 feet of sinking per month for three consecutive months in early 1955. This advance was made with native hand muckers. The tendency in newer shafts is toward circular shafts, concrete lined. Either twin shafts are sunk, with one used exclusively for ventilation, of if a single large shaft is used, a portion of it is bulkheaded to provide a ventilation compartment. Since the war, over 32 miles of shafts have been sunk in the whole area. The average cost of a rectangular shaft 47′ x 11′ has been approximately $320 per foot, and the average rate of advance was 120 feet per month. In some cases much larger shafts are in use, one being approximately 70′ x 11′; in most of these shafts, two compartments are completely sealed off to provide a return airway. Fans exhaust the air from the two sealed off compartments, the other compartments being down-cast. The main surface shafts are ordinarily limited to depths not exceeding 4,000 feet. Greater depths are service by internal shafts. The ultimate practicable mining depth will probably not exceed 8,000 feet.

In shaft sinking and development work, cementation cover is commonly provided by means of diamond drill holes in advance of the headings. Serious water flows have been encountered in many of the mines, especially in the Orange Free State, where pumping of 5,000,000 to 6,000,000 gallons of water per day is not uncommon. The water from the mines is, in many cases, unfit for use in the reduction plant, and is discarded into settling ponds.

Ventilation Important

Proper ventilation of mine workings is a very important phase of mine planning in South Africa, because of the high temperatures and humidity encountered at the usual mining depths. The amount of free air required at each working face is of the same order as that required in Ontario mines. It is usual, in the underground workings, to drive twin tunnels for main haulage ways, one for haulage, the other directly connected with the ventilation shaft and used as a return airway from the stoping areas. Air volumes of 400,000 cubic feet per minute are usual, and one property is planning to increase its volume of air to 1,000,000 cubic feet per minute. It is interesting to note that no special

ventilation has been provided or required because of the uranium content of the ore. That is, the volume of air required for ordinary ventilation purposes is considered to be sufficient to prevent accumulation of radon gas, as well. Refrigeration of air was not in practice at any of the mines visited, although it is under consideration.

All power used in the mining areas of the Transvaal and the Orange Free State is steam generated from coal mined in the area. The generating plants are located at the pit heads and coal is brought to surface at a cost of approximately $1 per ton. Power costs the mines about 0.3 cents per kilowatt-hour, compared with a cost of approximately 0.5 cents per kilowatt-hour in the Algoma District. The coal reserves are tremendous, some mines reporting 100 years reserves at present rates of production.

Native labor is used extensively, some of the larger mines employing over 4,000 natives. The natives are used almost entirely on hand labor, only a few having been trained to operate mucking machines, slushers, locomotives, rock drills, etc.

Administration

A large portion of the gold and uranium mining industry in South Africa is managed, financed and controlled by eight mining groups; namely, the Anglo-American Corporation, New Consolidated Goldfields, Central Mining, Johannesburg Consolidated Investments, Union Corporation, Anglo Vaal, General Mining and Strathmore. These groups control at least 62 producing and developing properties. These groups work very closely together. Information is traded freely between the various have their head office organization in Johannesburg.

The South African Chamber of Mines is a body which was formed by the various mining companies and groups to act for all member mines. It was organized as an Employer's Association; it handles all matters pertaining to recruiting and hiring all native European labor, the native labor requirements for member mines being in the nature of 300,000, with a labor turnover of about 100% per year; the Chamber has a committee which negotiates with labor unions on policy matters, but each mine negotiates its own contact; the Chamber, in case of a technical matter which affects all or most of the member mines, forms a committee from the staffs of member mines to study the problem and make recommendations which the Chamber passes on to members. (In this way, uranium plant design was worked out by a combined metallurgical staff and this design was used by the industry as a whole); the Chamber conducts research on various problems and passes the information on to its members, and circulates information of interest to members, such as papers written for distribution by the members of the mine manager's association. The Chamber of Mines presently has about 500 employees.

An active Mine Manager's Association meets regularly to consider problems and new developments in the industry. Papers are prepared by members for presentation and discussion at these meetings.

Summary

The above information is essentially of a general nature. Aside from the fact that the South African gold-uranium values occur in a conglomerate which is similiar to the uranium bearing conglomerates in the Algoma district, we found mining conditions so different that there is little basis for comparison in mining methods between the Algoma District Mines and those of South Africa. The main points of difference are:

1. Depth of Workings—South African mines extend from surface to 7,000 and possibly 8,000 feet. The presently known Algoma Mines extend from surface to possibly 3,000 feet.

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2. Labor — Native labor costs are low, approximately $1 per day for an untrained native, less 50 cents which is retained for board and room. This contributes to the lower degree of mechanization in the South African mines as compared with those in the Algoma district, where labor costs are considerably higher.

3. Thickness of Ore Zone—Values in South African mines are confined generally to very narrow zones. Their mining methods differ considerably from those proposed for the Algoma District, where average thicknesses are in excess of 8 feet.

4. Exploration Technique—Fifty or more years of experience in the Witwatersrand enables management to predict grade, ore reserves, profits, etc., quite accurately, on the basis of drill holes spaced at approximately one mile intervals. The Algoma District operators, with only two years of experience in the area, must drill at closer intervals. These intervals are increasing, however, as more information is assembled.

5. Ventilation—Very large quantities of air are required in most of the South African mines because of the spread out nature of the working places, and the heat of the workings at depth. It was reported that virgin rock temperatures of 103° are common at the bottom of an average shaft, and 114° at 6,000 feet. The temperature gradient in some parts of the mining area is 1° per 90 feet. No special ventilation procedure has been necessitated by the presence of uranium in the area.

Acknowledgement

Our tour of the mines in South Africa was arranged through the Rio Tinto organization, and the trip was extremely well organized. We were greatly impressed by the scope of the gold and uranium industry and by the organization which operates it. Our trip was made pleasant as well as instructive through the hospitality and kindness of the people who conducted us on our tour of the mines.

CAPITAL REPORT

by M. L. SCHWARTZ

Ottawa Correspondent

Mining and Booming Economy

OTTAWA—Canadian economy is booming as never before, according to economists here, and no immediate signs of a slackening of pace are evident, though they intimate that the boom in Canada is not as broad nor as dramatic as in other countries, particularly the United States and the United Kingdom.

Activity in the mining industry has kept pace, most branches remaining fairly stable or showing signs of picking up. The mining index advanced almost 13% in the first half or so of 1955, and the improvement may be accelerated as the year advances.

Labor-Management Relations

LABOR-MANAGEMENT relations in the mining industry are better than in many others and, less time has been lost in disputes in this industry than in others this year. Moreover, average hourly earnings in the mining industry have increased much less in the past twelve months than in many others. As at May 1st this year, earnings rose from 158 cents to 160.3 cents during a 12-months period, though the situation varied in different branches of the industry. For instance, in metal mining the hourly rate jumped to 165.3 cents from 162.2; in gold mining, the increase was from 139 cents to 139.7; in other metal mining, it moved to 180.3 cents from 176.7. In fuels, there was a decline from 153.5 cents to 152.7 this year, with coal mining falling to 146.7 cents from 147.5, and oil and natural gas declining to 171.9 cents from 172.6. Non-metal mining operations found such rates up at 151.3 cents from 146.9 a year ago.

Canada No Great Exporter of Secondary Products

SINCE Canada is the biggest exporter of aluminum in the world, practically the only source of nickel in the world, and an exporter of copper as well as other products of mining, authorities here are rather resentful of the criticism that Canada could export more secondary products than presently being sent out of this country instead of so much raw material.

"We have never been great exporters of secondary products," said a spokesman for the Canadian Government, emphasizing that countries export the products of which they are the most efficient producers, and "there is no use attempting to export a product which is built here under handicaps. In general, secondary industry is built to supply the Canadian market."

Uranium Is In The News

DESPITE all the rumors which are circulating about uranium and its future in Canada, official sources here say bluntly that atomic energy is still in the expansion stage in this country and it has not actually reached operating level, with the Crown-owned Eldorado Mining and Refining Limited "doing very well indeed," using the exact words of an official informant, a broad hint of things to come. Official sources point out that in the past year important developments in several parts of Canada combined to make it a most significant year for uranium mining.

The Picture Is Not Bright

CANADA'S coal industry is in a precarious position and it is difficult for the authorities to be optimistic about its future, Hon. George Prudham, Minister of Mines and Technological Surveys, intimated to Parliament.

Speaking at some length on the adverse aspects of the situation he pointed out some phases which are not so dark, including in particular an effort by some operators to diversify their operations, such as two firms which have now embarked on a very extensive exploration program for base metals in their areas and other engaging in lumbering, oil business, etc., in order to supplement earnings and provide employment.

The Minister said, "I am convinced there will remain a sizeable market for Canadian coal. This may increase substantially over the next 10 to 20 years as our country ex-

pands. In the immediate future, however, there will be very serious changes and transitions within the coal industry. The greatest challenge facing the industry at the moment is that of reducing the cost of production in order to meet competition. You cannot separate the cost of production from the marketing problem. If the industry is successful in reducing costs, the markets will be correspondingly improved."

News Roundup

DEPARTMENT of National Revenue has given notice that aluminum octoate has been transferred from the category of a kind not made in Canada to that of made in Canada, with resultant effects on the customs tariff . . . Only 35 miles from this capital, a mountain of asbestos will be worked and it is forecast that about 1,100,000 tons will be mined from that hill. The only other such hill known is at Globe, Arizona . . . Gold production from base metal mines advanced to 227,702 fine ounces in the first five months of 1955, in contrast to 173,402 in the same period of 1954, and gold production from auriferous quartz mines and placer deposits reached 1,614,274 fine ounces in this period as compared with 1,541,352 a year ago . . . A pre-paid group medical services plan known as Physicians' Services Inc., is now in operation in the Department of Mines and Technical Surveys . . . Officials report that unemployment opportunities for this year's university graduates appear to be about as plentiful as a year ago; more than 17,000 employment openings were recorded by the executive and professional Division of National Employment Service . . . Imports of mining and metallurgical machinery increased to $26,004,000 in the first five-months period of 1955 in contrast to $24,018,00 in the same period of 1954 . . . Experts believe that important columbium-uranium deposits will be uncovered in Jones Township in Ontario. It is about 130 miles west of Ottawa and is said to be about 90% exposed rock, or rock which can be readily stripped . . . Expansion is decreasing in the iron and steel products industry and in the first quarter this year only 800 new jobs were reported as compared with 1,700 in same period last year. Between 1948 and 1954, this industry group created 18,400 new jobs, more than 7,000 of which became available in 1952 and 1953. Last year, 2,250 new jobs were created, despite a decline in employment of 10% from 1953 level. It should be pointed out, however, that on the average the new jobs created in one year are the result of investment in new plant facilities made the preceding year so that the reduced level of investment for new facilities in 1954 is now being reflected in the reduced requirements for additional workers this year . . . Mining operators will be interested to know that, if a company is interested in a large private project in Canada, information can be obtained from the Department of Trade and Commerce's Economic Branch as to the economic merits or otherwise of such a project under certain conditions. "Any information available in the branch could be made available in connection with a private project," said a spokesman for the federal Government. "We are not consulting engineers, but the purpose of the department is to be of service to Canadian business and any service the department can render is rendered gladly to Canadian businessmen." It is a small branch, but it has been an extremely useful one, particularly on projects such as pipe lines or projects requiring a combination of engineering and economics to make a proper study.

More engineers are needed to meet the growing demands of the present alloy age, said F. L. LaQue, vice-president of International Nickel Co., in an address to the American Society for Metals.

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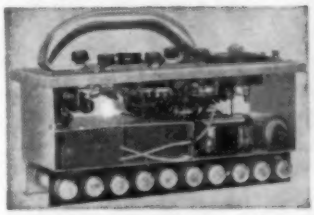

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METAL MARKETS

Demand Continues Strong for All Major Metals. — Some Copper Users Turning to Aluminum. — Lead Prices Boosted Half a Cent. — Zinc Market Firm and Stable. — Primary Aluminum Output Continues at All-Time Record High Rate.

NEW YORK—The metal price rise relay race continued last month. While copper and zinc marked time, lead grabbed the baton and spurted ahead a half-cent. The lead price increase was the first for this metal since October of last year. Demand continued strong for all the major metals.

Some copper producers, who have watched the red metal's price soar 13 cents this year, are pondering whether the advance was "too much and too soon." The threat that consumers will push the substitution of other metals—particularly aluminum—was emphasized further last month in the electrical industry.

Citing spiraling copper prices and repeated shortages in copper supply, Western Electric Company, one of the nation's largest users of copper, announced it is moving ahead with a definite engineering development program looking toward the substitution of aluminum for copper in the manufacture of telephone cable. The company, a unit of the Bell System, furnishes cable and wire to Bell Telephone companies throughout the country. It uses about 100,000 tons of copper a year.

Those domestic producers who have been stressing the long-range problems that high copper prices may bring have been unable to stem the inflationary tide because they lacked the "chips" to throw into the market. Strikes at home and abroad at a time when fabricators' stocks of copper were low and when U.S. and foreign consumption was climbing, combined with the gyrations on the London Metal Exchange, were the economic factors that helped propel the copper price to 43 cents a pound.

Despite the fact that demand still exceeds the supply, there has been less talk recently of another copper price rise. Indicating a slight softening in the market are reports that buyers are less eager for premium-priced copper and the fact that the scrap market is weaker. However, fabricators are still anxious to rebuild their depleted inventories, especially because of the taxes that must be paid under the last-in-first-out (Lifo) method of inventory accounting.

Fabricators are using copper that was acquired when the price was lower and, unless they can replace their stocks with higher-priced metal, will have to pay higher taxes. With this prop under an already firm demand, there seems little to warrant the belief that the copper price will go lower in the immediate future.

In their clamor for more copper, consumers have beseeched the Government for aid, but have been turned down. Copper users had urged the Government to release from the national stockpile the 100,000 tons of metal that had been acquired to aid the Chilean economy. Government spokesmen pointed out that no metal could be freed from the stockpile unless there were a national emergency or Congress changed the law. Both possibilities are remote. Also spurned was a suggestion that the federal Government buy copper outside the U.S. at world prices and resell it to domestic consumers at the lower quotations prevailing at home.

A bright note on the supply situation was sounded in the quarterly report of the Copper Division, Commerce Department. The agency said that for the fourth quarter of 1955 it is anticipated that there will be a rough balance between supply and consumption demand for copper in the U.S. provided scheduled deliveries to government account are deferred, restrictions are maintained on the flow of copper from this country and no more work stoppages occur. "The supply of copper, however, will be insufficient to permit satisfactory rebuilding of dangerously low working inventories," the agency predicted.

Domestic production of primary copper in August still showed the effects of the strike. August output of 67,635 tons was more than double the 31,846 tons turned out in July, but far below the second quarter monthly average of 93,115 tons. Refined production in August came to 98,732 tons against 51,182 tons in July. Shipments of electrolytic metal to domestic consumers amounted to 90,078 tons, a gain of 29,935 tons from July. At the end of August, producers' stocks of refined copper came to 49,350 tons, up 13,057 tons during the month. Actual consumption of copper by brass and wire mills is placed at 98,418 tons in August as compared with 75,846 tons in the previous month.

Lead Highest Since June, 1952

THE INITIATIVE in the lead price advance was taken by the St. Joseph Lead Company, which posted a half-cent rise to 15.50 cents a pound at New York. This was the first lead price change since October, 1954, and brought the metal to its highest level since June, 1952. The company attributed the increase, which became industry-wide, to higher costs, good demand and materially-reduced stocks.

Following the price boost there was considerable speculation as to what effect the rise would have on the Government's stockpiling policy. Last year the Government announced an extended stockpiling program that envisaged the purchase of 200,000 tons of lead and 300,000 tons of zinc. At the first the Government's pricing formula was 27 cents a pound for the two metals and this was reported modified earlier this year to 28 cents. It was understood that the Government would continue to buy zinc at 13 cents a pound (which it did) and lead at 15 cents. It is estimated that the Government has acquired about 135,000 tons of lead for the stockpile, so that 65,000 tons remain to be bought.

Some industry factors believe that the civilian demand for lead is such that even if the Government withdraws as a buyer for the stockpile, producers will have no difficulty in disposing of their intake. Domestic shipments of refined lead in August were 41,469 tons, an increase of 14,922 tons over July. For the first eight months of this year, shipments aggregated 333,486 tons against 336,424 tons in the same period last year.

Domestic production of refined lead in August also showed recovery from the strike in the previous month. The August total was 36,912 tons, an increase of 13,062 tons over July, but still far below the 50,000 tons produced in March and in April. In the first eight months of 1955, U.S. lead output came to 339,882 tons, compared with 359,363 tons in the similar period of 1954, a decrease of 19,481 tons. At the end of August, producers' stocks of refined lead amounted to 34,111 tons, a drop of 5,745 tons from July and the smallest they have been since the end of September, 1952.

Little Change in Zinc Expected

THE ZINC MARKET continues firm and stable. While zinc producers have had no line of buyers knocking at their doors, they have been doing a satisfactory volume of business each day. Prime Western is going to galvanizers at a good rate and more Special High Grade metal could be sold if it were available. Producers have found no resistance to the prevailing price of 13 cents East St. Louis for the Prime Western Grade.

At a recent meeting of the American Die Casting Institute, zinc industry leaders forecast that an adequate supply of zinc would be available at stable prices. Charles R. Ince, vice-president, St. Joseph Lead Company, said he expected little or no change in the price of zinc in the next few months and "possibly throughout 1956."

Shipments of all grades of slab zinc to domestic consumers in August came to 87,042 tons, a gain of 10,230 tons over July, but still about 5,000 tons below the peak of the year attained in June. For the first eight months of this year, the shipments to domestic consumers amounted to 659,590 tons whereas in the similar period last year they were only 497,433 tons, a gain thus far in 1955 of 162,157 tons, or about 32 per cent.

With production holding steady (84,877 tons in August against 84,400 tons in July) and shipments rising, producers' stocks fell to 46,087 tons at the end of August, a drop of 5,203 tons during the month to the smallest level since May, 1952. In May of last year, these stocks were close to 210,000 tons, and, since the beginning of 1955, they have been slashed by 78,190 tons. Unfilled orders at the end of August amounted to 73,632 tons, an increase of 9,576 tons over July to the highest point since May, 1951.

Aluminum Output at All-Time High

ALUMINUM made the front pages last month when the Government included this metal among those which no longer will get fast tax write-offs to spur expansion. The decision to close the primary aluminum expansion goal rejected applications from five companies for about $424,000,000 of accelerated amortization. Most of the companies reportedly are ready to go ahead with their projects despite the Government's action. Primary aluminum output, meanwhile, continues at an all-time record high rate. In the first eight months of 1955, primary production totalled 2,052,171,990 pounds against 1,933,714,005 pounds turned out in the 1954 period.

Silver prices advanced 1.125 cents an ounce last month to 91.875 cents at New York. Trade sources attributed the increase to strong demand, coupled with an absence of foreign offerings from traditional sources, including Mexico, and the Government's decision to raise its selling price to 92.25 cents. Incidentally, the question of a possible rise in the gold price was debated at the World Bank meeting in Turkey at which time the U.S. reiterated its objection to the step as inflationary.

Nickel has remained in short supply and the Government approved the diversion of another 2,500,000 pounds from the delivery to the stockpile to industrial users in October.

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Keeping Tab on Mining in British Columbia

Bralorne Mines Limited

BRALORNE Mines Ltd. has opened the best ore length in the history of the mine.

On 31st level, 750 ft. vertically below the 1,200 ft. long 26th level oreshoot on No. 77 vein, which was the previous record oreshoot, the company had by late September drifted 550 feet on ore considerably above mine average in grade and width. The west face had widened to 15 feet.

None of the levels between 26 and 31 has as yet been fully drifted out.

Mill feed from the richer ore on and below 26 will begin to be reflected in production and profits in a few months, following installation of a large operating hoist to serve the new block of levels.

Granby Consolidated

IN ADDITION to its large scale exploration program at Granduc Mines Ltd. in northwestern B.C., and to a stepped up program at its large tonnage Copper Mountain mine in south central B.C., Granby Consolidated is maintaining an aggressive hunt for new major ore sources.

This has included a return to Granby's original stamping ground, the Phoenix camp near Greenwood, B.C. This is across the U.S. border from Granby's Lone Star property in Washington state. Under agreement with W. E. McArthur, of Greenwood, the present owner, Granby is proceeding with drilling on part of its old Phoenix property. McArthur says that when he bought the abandoned property in 1937, when copper was 7c a pound, he was confident it was worth $20,000. Copper is now 47c and the big company has moved back in with the possibility of developing several million tons of low grade copper ore.

Yreka Mines Limited

AFTER getting encouraging results in initial work over the past three seasons, Noranda Explorations Ltd. in 1955 proceeded with an adit which has been successful in intersecting the ore zone at considerable depth below the outcrop.

Results to date have proven the presence of a substantial tonnage of copper ore averaging about 3%.

At 180 ft. from the portal, the exploration adit first cut an eight foot zone of well-mineralized copper ore. Then, at from 360 to 405 feet from the portal, a second zone was intersected which is interpreted as the ore zone indicated by previous diamond drilling. Opening up of this ore zone is proceeding by drifting on the zone. This will be supplemented by diamond drilling.

A controlling interest in Yreka was optioned by Noranda in 1951 from Allan C. Watt and Knut Akre. The property is on tidewater on Quatsino Sound on Vancouver Island in a location suitable for low cost operation.

Jackson Basin Mining Co. Ltd.

COPPER prospect claims acquired in Highland Valley in the Ashcroft district will be given precedence in the current exploration program of Jackson Basin Mining Co. Ltd. Preparations for mill operation at the company's original silver-lead-zinc mine in the Slocan are continuing, but an uranium prospect, also in the Slocan, has been dropped. Early in September the company completed acquisition of a 100% interest in the Highland Valley claims.

At time of writing dewatering of an old shaft on the property had been well advanced with plans calling for diamond drilling from underground. Occurrences in old trenches, pits, shafts and tunnels point to an overall width of mineralization of 5,000 feet and a length of 6,000 feet.

Gabbro Copper Mines Ltd.

A FEW months ago Noranda Exploration Ltd. optioned sufficient of the treasury and privately held shares of Gabbro Copper Mines Ltd. to give Noranda control should all options be taken up.

Geological and geophysical surveys since carried out have disclosed anomalies which are now being diamond drilled.

The Gabbro claims are in the rugged Jordan River area 40 miles west of Victoria, B.C., at the south end of Vancouver Island. They adjoin the partially developed Sunloch Mines property controlled by C. M. & S. Co. of Canada Ltd., but at present idle. The present campaign on Gabbro may determine the relationship long thought to be present between the occurrences on the two properties.

An initial 5,000 ft. of diamond drilling has been arranged by Noranda. B. O. Brynelson is the engineer in charge for Noranda.

Brikon Explorations Ltd.

FLYING in diamond drill equipment from Whitehorse, Yukon, to within four miles of the property and packing it by means of horses the rest of the way has been adopted as the solution for determining the possibilities of a copper prospect in the Atlin area, northwestern B.C., optioned by Brikon Explorations Ltd. Action of the waters of a creek exposed copper mineralization at intervals for more than 300 feet and it was possible to sample a 53-ft. section which averaged 1.18% copper and 0.43 oz. silver, reports J. D. Mason, president.

Backers of Brikon are Transcontinental Resources Ltd., Dome Mines, Timmins Corporation, Chemical Research Corporation, Sapphire Petroleums, and Yellowknife Bear Mines Ltd.

Bethlehem Copper Corporation Ltd.

ARRANGEMENTS are being made by American Smelting & Refining Company for the start of a continuous exploration program on the property of Bethlehem Copper Corporation Ltd.

This follows the recent completion of an agreement involving as a first step the expenditure of approximately $200,000 by the major company on Bethlehem Copper's 100-claim property in Highland Valley, southeast of Ashcroft, B.C.

H. H. Huestis, Bethlehem president, says his information is that A. S. & R. has already made arrangements with Boyles Bros. Drilling Co. to move diamond drilling equipment on to the property as soon as rigs are available. The drills will give 2⅛-inch diameter core.

He is informed also that the big company has made arangements for a D-8 caterpillar tractor from Marwell Construction Co. This will be used in connection with establishing a camp for the drilling crew for the winter operation close to the scene of drilling. It will be available for stripping operations and for general purposes of an exploratory project. It is expected the present camp on Divide Lake will be used by the supervisory staff.

Mr. Huestis says that the nature of the preparations indicates that the A. S. & R. program will soon be under way on a scale calculated to determine the ore tonnage possibilities of the property as quickly as possible. If the big company carries the property to production, profits will be divided 55% to A. S. & R. and 45% to Bethlehem Copper.

B.C. Mica Mines Ltd.

NEXT STEP toward its objective of creating a North American source of mica is being taken by B.C. Mica Mines Ltd.

This British Columbia company was started a year ago by Vancouver principals aware of the possibilities of a mica deposit on the southeasterly tip of the Alaska Panhandle, 34 miles north of Prince Rupert, B.C. They acquired this deposit for the company after economic studies convinced them of the profit opportunity inherent in the fact that North America is in the position of having to import approximately 90% of its requirements of mica, which has numerous essential applications, both in peacetime and defence industries.

B.C. Mica Mines directors advised late in September that the company had initiated studies to determine what the Pacific Coast market consumption of mica would support in tonnage production so that plans for mill construction might be determined. With this information available there are stated to be good prospects of completing arrangements with a large U.S. operating mining company to finance and manage the project.

Company officials say their engineering reports point to success for an industry capable of turning out a large volume of ground mica and the lower grades of sheet mica. The work now being undertaken is aimed at determining the possibility of producing also the large sheets of high quality mica used in the electronics and aircraft industries.

B.C. Mica Mines Ltd. has 3,000,000 authorized shares, $1.00 par, of which 750,000 were issued for properties and are in escrow and 200,000 have been sold for cash. Directors are: O. Cote, president; W. Bennett, V. McCrossan, solicitor, and B. W. W. McDougall, P.Eng.

Silver Hill Mines Ltd.

PROGRESS in ore development and in mill installation at Silver Hill Mine warrant the expectation that operations will start about November 1st.

This summarizes the findings of B. W. W. McDougall, consulting mining engineer for Silver Hill Mines Ltd., following a detailed inspection of the mine and mill on Treasure Mountain, 21 miles west of Tulameen, B.C.

Mr. McDougall reports that at mid-August the new flotation mill of 50 to 60 tons daily capacity was more than 80% completed. He confirms that working on a two-shift-daily basis the ore reserves indicated by previous work can be made available for stoping within the two months' period. He points out that the general development plan is simple. The main footwall vein has been opened to a total on-the-dip depth of nearly 1,500 feet with the result that the raise affords convenient development access in both directions to a very large vein area.

Several consulting engineers have reported indicated ore of at least 65,000 tons, having gross value of the order of 10 oz. silver, 7% lead and 10% zinc.

Mr. McDougall's comment is that a thoroughly up-to-date metallurgical plant is in the final stages of construction and that the works program has been competently carried out under direction of E. L. Borup, manager. The engineer says the flow-sheet is almost precisely similar to those adopted by the principal silver-lead-zinc mills of the province. Adequate space has been left for increasing the capacity without expensive alterations to the building.

Power units including a diesel-driven generator and 500 cfm air compressor are housed in a new aluminum-clad building on the same level as the lower floor of the mill. Ore trains will deliver the ore directly to the coarse ore bin adjacent to the lower adit.

For mining purposes new levels are to be opened at about 150-foot intervals from the long upraise. The first of these sub-levels, says Mr. McDougall, should disclose the first oreshoot, some 300 feet long. Other available ore sources include the vein area on the horizon of the new sub-level to the east of the main upraise and the opened vein areas between the No. 2 and No. 1 levels. Ore will be dragged down the long upraise by slusher and thence loaded by gravity into mine cars and trammed by storage-battery locomotive to the mill.

B.C. Progress Notes

SILVER STANDARD MINES LTD., after fixing the position of a good looking high grade ore shoot on No. 11 vein below the major fault, is extending the 1500 level to tap this attractive new ore source. One of the intersections averaged $180 per ton across 42 inches.

United Estella Mines Ltd. has started work on two optioned copper properties in addition to getting favorable results at depth at its original lead zinc mine at Wasa, B.C. The Mountain Chief copper claims north of the old Phoenix-Greenwood camp have been optioned and the Copper Queen, a new discovery south of the Highland Valley copper camp, has been staked.

Silbak-Premier Mines Ltd. is exploring an anomaly located by electrical geophysical survey 2,000 feet east of the old Premier gold-silver ore zone.

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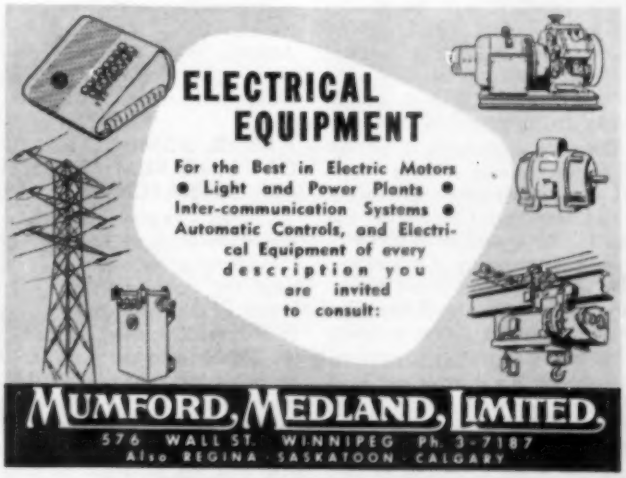
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Men... IN MINING

Dean, Hirshhorn, Wilson Join Board of Callahan Zinc

GORDON DEAN

JOSEPH HIRSHHORN

JOSEPH T. HALL, President, announces that Callahan Zinc-Lead Co. has increased its board of directors from six to nine members with the election of three new members, Gordon Dean, who is associated with Lehman Brothers; Joseph H. Hirshhorn, metal mining executive; and Philip D. Wilson, consulting mining engineer and geologist.

Mr. Dean, former chairman of the United States Atomic Energy Commission, is a senior vice-president of General Dynamics Corporation and chairman of the Board of Nuclear Science and Engineering Corporation. He is also a director of Fruehauf Trailer Company and the Norden-Ketay Corporation, which is the parent company of Nuclear Science.

Mr. Hirshhorn is a director and large stockholder of Algom Uranium Mines Limited and of Pronto Uranium Mines, Limited, which recently went into production in the Blind River area of Ontario. Mr. Hirshhorn is also a stockholder and director of other uranium companies and mining and oil ventures in Canada.

Mr. Wilson is a member of the finance committee and a director of the American Institute of Mining and Metallurgical Engineers, a vice-president of the Mining and Metallurgical Society of America, and a member of the Society of economic Geologists. He is now associated with Lehman Brothers.

NAMED ADMINISTRATOR OF PETROLEUM STATISTICS FOR SASKATCHEWAN

Charles Douglas McKenzie, a 1950 University graduate, has been appointed administrator of petroleum statistics with the petroleum and natural gas branch of the Saskatchewan Department of Mineral Resources. Succeeding James W. MacNeill to the post, Mr. McKenzie holds two degrees from the University of Saskatchewan—Bachelor of Arts and Bachelor of Commerce.

Retiring as research economist, Mr. MacNeill has resigned his post to return to the University of Saskatchewan where he is going to further his studies in engineering and business administration.

JERRY COOPER TO HEAD JOY MFG. CONTRACT DRILLING DIVISION

JERRY COOPER

Drilling under contract will be performed anywhere in Canada, says Jerry Cooper, manager of the contract core drilling division recently formed by Joy Manufacturing Company (Canada) Limited of Galt, Ontario.

Scope of services offered will include: surface exploration drilling for all mineral deposits; underground exploration drilling; foundation test borings and grout hole drilling for bridges, dams and all heavy structures. Eight branch offices across Canada, as well as the head office and works at Galt, will offer latest techniques and the newest equipment available, say Joy engineers.

Mr. Cooper has had wide drilling experience since starting as a drill helper in 1931 with Smith & Travers Co. in central Manitoba, Rice Lake District. From 1952 until this year he was superintendent with Heath & Sherwood Drilling Ltd., Kirkland Lake.

MANAGERIAL APPOINTMENTS

A number of new managerial appointments by James Richardson and Sons was announced by Ralph D. Baker, general manager.

R. W. Spear who has been resident manager of the firm's Regina office since 1951, will now occupy a similar position in the Winnipeg Main Street office, succeeding S. B. Phipps, who has been transferred to Toronto. Replacing Mr. Spear at Regina will be O. E. Buker who, in recent years, has held a senior position in the firm's Vancouver office.

Earl V. Shaw, Vancouver, now becomes resident manager at Lethbridge.

PYRENE APPOINTMENT

W. J. WADDELL

H. B. Weed, president of Pyrene Manufacturing Company of Canada Ltd., announces the appointment of W. J. Waddell as the company's representative in Alberta and Western Saskatchewan, for the well-known Pyrene and C-O-TWO lines of fire extinguishing equipment. Mr. Waddell is well-known throughout Western Canada, having travelled this territory for several years past.

Robert B. Anderson Appointed Ventures Limited President

Thayer Lindsley, founder of Ventures Limited, announced that arrangements have been completed for Robert B. Anderson, who recently resigned as United States Deputy secretary of defence, to become president of the world-wide mining company.

Mr. Lindsley, retiring president, is scheduled to become chairman of the board at a special shareholders meeting to be called for the purpose of creating that position.

Ventures Limited, a Canadian holding company, formed in 1928, is engaged in mining in many countries of the free world. Through its subsidiaries and affiliates, Ventures controls or has an interest in some 15 operating companies, 20 development companies and some 145 participations in the mining, research and metallurgical fields.

Mr. Anderson joined the Eisenhower administration as secretary of the navy in February, 1953. He was promoted to deputy secretary of defence early in 1954 and continued in that position until his resignation in August of this year.

ROBERT B. ANDERSON

Production of steel ingots in May amounted to 376,249 net tons compared with 252,988 net to tons in May, 1954. Pig iron production was 284,311 net tons, compared with 178,742.

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RETIRES AFTER 35 YEARS' SERVICE WITH C.I.L. (1954)

H. W. REED

Mr. Reed, Sudbury district sales manager for the explosives division of Canadian Industries (1954) Limited, has recently retired from the company. He has just completed 35 years with the company, 25 of which were spent in the Sudbury area.

Previous to joining Canadian Industries (1954) Limited, he served on the Northwest Mounted Police, the original "Mounties". As a member of the Canadian Expeditionary Force during World War I, he crossed the ocean more than thirty times ferrying troops. During his years in the explosives field, Mr. Reed has actively assisted in the part explosives have played in the development of the great mineral potential in the Sudbury Basin area of Ontario.

He is succeeded by E. B. Stovel as district sales manager for explosives in the Sudbury area.

An aircraft industry employee of Dallas, Texas, has sold his interest in a Utah uranium discovery for $4,000,000.

NAMED ASST. MANAGER EXPLOSIVES DIVISION CANADIAN INDUSTRIES (1954)

H. J. DESBARATS

who has been appointed assistant manager of the explosives division of Canadian Industries (1954) Limited. He has been associated with the production of high explosives for more than 25 years and during that time, in addition to supervising production of explosives at the company's plants in Canada, has studied safety techniques and supervised operations abroad.

ELDORADO'S MILLING FACILITIES TO BE EXPANDED

The Crown Corporation has announced at Ottawa that Eldorado Mining and Refining Company's milling facilities at Beaverlodge, Sask., will be expanded from 700 tons per day to 2,000 tons per day. The new capacity will be in operation in the first quarter of 1957, it is expected.

Estimated cost of the expansion is $12,300,000, of which $6,500,000 will be for additional milling capacity and the balance for power plant etc.

DEVELOPMENT OF LOCAL BEAVERLODGE AREA TO BE STUDIED

A committee has been appointed by the Saskatchewan government to study and advise upon the future development of the Beaverlodge local development area, according to Hon. J. H. Brockelbank, minister of natural resources.

Committee members are C. S. Brown, northern administrator; G. J. Darychuk, resident administrator of the department of natural resources; and D. D. Tansley, director of the administrative management division of the Treasury department. Consultants are appointed from the departments of municipal affairs, education and public health.

The committee will examine requirements of the Beaverlodge local development area and recommend a practical program of education, health and municipal services. In addition, the committee will examine and suggest the immediate framework for carrying out such a program; the long term administrative framework for governing the area; and the method of financing various programs.

Mr. Brockelbank said the committee which is to submit recommendations on or before June 1, will spend some time in the area and consult with ratepayers, mining companies and interested organizations.

The minister also said that the committee may obtain information from other jurisdictions which have similar conditions, and if they deem it of sufficient value, consult with officials in such areas.

JOINT DEVELOPMENT OF COLUMBIUM-TANTALUM

Molybdenum Corporation of America and Kennecott Copper Corporation have announced a joint development of a columbium-tantalum ore deposit at Oka, Que., about 43 miles southwest of Montreal.

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INDUSTRIAL TOPICS FOR... MINING MEN

Contract Awarded For Du Pont's New Plant Near North Bay, Ont.

GENERAL CONTRACT for the 30-building, $7,000,000 commercial explosives plant in West Ferris Township, about five miles southeast of North Bay, to be built by Du Pont Company of Canada Limited has been awarded to the Fraser-Brace Engineering Company (Ontario) Limited. The plant is expected to go into production within 15 months.

At the same time, the company announced the appointment of W. D. Irwin as manager of its new explosives department; C. T. Hambley, a native of North Bay, as sales manager; and Frank A. Reid as manager of the plant located in West Ferris. Until they transferred to the explosives project, Mr. Irwin had been manager of the films division, Mr. Hambley a member of the chemicals department, and Mr. Reid a member of the engineering department.

At the outset of operations the plant will provide employment for up to 100 persons, the majority to be recruited in the Nipissing district, with the number rising gradually to about 175 as production increases over the next few years.

The buildings to be erected include office, services and process units and magazines. With the exception of two process buildings several storeys high, they will be single-storey structures of reinforced concrete, concrete block or steel or wood frame construction ranging in size from 100 x 75 feet to 50 x 12 and, in a few cases, smaller buildings.

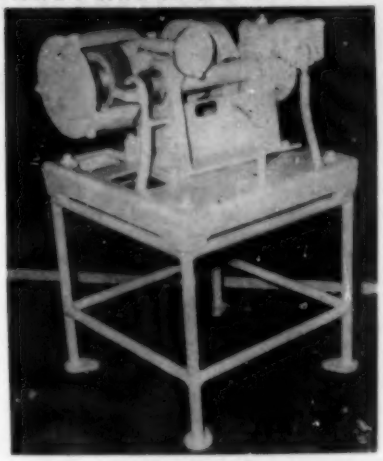
The plant will incorporate the latest advances in design and will be one of the few on the continent employing in its manufacturing operations the new continuous nitration process. It is planned to draw the required process water from Lake Nipissing.

Erection of the plant marks the return of Du Pont of Canada to the commercial explosives business which its predecessor companies had engaged in since the days of the Canada Powder Company, founded in 1852. It also is the fourth new plant announced by the company within the last 15 months.

Nearing completion at Maitland, Ontario, is a unit for the manufacture of "Freon" fluorinated hydrocarbons, gases used as refrigerants and as the propellants in aerosols. Construction has begun on an industrial finishes plant at Ajax, Ont., and engineering design is under way for a plant at Maitland to make "Orlon" acrylic fibre. In addition, Du Pont of Canada has just completed the first unit of a research centre at Kingston, Ont.

Previously in operation were plants at Shawinigan Falls, Que., for the manufacture of "Cellophane" cellulose film, polythene film and cellulose sponges; at Maitland for the manufacture of the basic chemicals used to make nylon; and at Kingston for the manufacture of nylon yarn.

PNEUMATICALLY OPERATED TAPER SHANK GRINDER



The JOY TSG 200 is a pneumatically operated taper shank grinder designed and built in Canada. It will grind a perfect taper on drill rods for the attachment of Joy Copperhead Bits with taper socket—the latest and most successful development in carbide drilling tools.

Actual experience in mine shops across the country shows that perfect tapers can be ground on drill shanks with the TSG 200 at a fraction of the cost of performing this operation with other machine shop tools or grinders.

About 1,200 workers at the Kitimat plant of Aluminum Company of Canada will receive wage boosts of from four to seven cents an hour under an agreement between the company and the Allied Aluminum Workers Council (AFL).

MODERN MINING EQUIPMENT

Gardner-Denver Company
Rock drills, mine car loaders, slushers, steel sharpeners, compressors and pumps.

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Ransomes & Rapier Ltd.
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Knox Manufacturing Co.
Valves and couplings.

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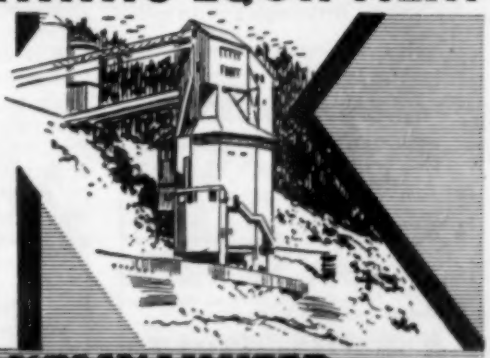
Specialized lubricants.

Hemelat Engine Co.
Underground diesel locomotives.



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Transportation Vital to Mining Industry of N.W.T., Yukon

IMPORTANCE of improved transportation facilities to the development of the mining industry in the Yukon and Northwest Territories was emphasized by R. O. Robertson, commissioner N.W.T. in his opening address at the ninth session of the Council of the Territories on August 29. Partial text of Mr. Robertson's address follows:

It is appropriate that the Council should be meeting once again in Fort Smith, which is not only the administrative centre of the Northwest Territories but also the head of the long water transportation system of the Territories: the Slave River, Great Slave Lake, Mackenzie River system. While there are a number of problems to be faced in the economic development of the Northwest Territories, few people will disagree that the most difficult and important is transportation. In part this is purely a matter of distance, the long distance which the mining centres and other settlements in the Territories are from their markets and sources of supply. Edmonton — the "jumping off" place for the Territories — is by rail 2,000 miles from the markets and manufacturing centres of eastern Canada. Yellowknife, by rail and water is another 886 miles from Edmonton, and Yellowknife is only on the southern edge of the Territories. Distance in transportation results in increased costs, and high costs are a problem throughout the economic structure of the Northwest Territories.

Another aspect of the transportation problem derives directly from the inherent nature of the Territories, or of any other pioneer region. The long distance between settlements and the sparse population make traffic density very low. This in turn makes any form of transportation expensive and tends to discourage the provision of adequate services. The cheapest form of transportation in a pioneer country is the water routes. When these happen to be rivers like the Yangtze, the Irrawaddy or the Amazon, they prove very satisfactory for the region within easy reach of them. When the river in question happens to be the Mackenzie and its tributaries, flowing through a climate that is cold a good part of the year, and closed to navigation for about eight or nine months out of twelve, its utility is distinctly limited.

Many Problems Created

The high transportation costs affect enterprises in the Territories in several ways. They are a direct burden on the expense of bringing in equipment and operating supplies and of shipping out concentrates and other products. They are also an indirect burden because the higher costs of living, due in substantial part to the costs of transportation, make it necessary to pay more for labor in one form or another, whether by higher wages or by subsidized board and lodging or free transportation or other benefits. In addition, the short navigation season requires the keeping of high inventories, a costly process. The slowness and infrequency of river transport may cause loss of production time through delays in getting necessary spare parts or equipment. All these costs taken together represent a formidable total. As a result, any program designed to stimulate the economic development of the Territories must have as its kernel a determined attack on the problem of transportation.

Members of the Council will recall that at the last session two matters relating to transportation were discussed at some length. The first concerned the level of rates charged for the movement of freight on the river system. After the session the president of the Northern Transportation Company Limited and I, along with officials of the Northern Transportation Company and of the Department of Northern Affairs, had several discussions on this matter. Later a substantial reduction in freight rates between many points on the Mackenzie River system was announced by the Northern Transportation Company for the current navigation season. Following the freight rate reductions by Northern Transportation Company, Yellowknife Transportation Company announced similar reductions.

Substantial Benefits Conferred

At about the same time that these discussions on water freight rates were going on, Canadian Pacific Airlines, following public representations from Yellowknife, carried on discussions with the Air Transport Board which led to a substantial reduction in air passenger rates between Yellowknife and points in the Northwest Territories. These reductions amounted to 17% between Edmonton and Yellowknife and to a much larger percentage between certain other points where the previous rate had been proportionately higher.

I think that members of the Council will agree that these reductions in water freight rates and air passenger rates will be of substantial assistance to the Territories. It is important to recognize that assistance to territorial development is likely to come, not through any one revolutionary change, but through a variety of adjustments which, in their cumulative effect, will achieve significant proportions.

We are not permitting the fact that some progress has been achieved to beguile us into letting the grass grow under our feet from now on. I would like to mention three further matters relating to transportation to which active study is being given.

Ferry Service Needed

The first of these is the second matter which was raised at the January session of this Council, the question of a ferry service between Hay River and Yellowknife. It was advocated that the government should take steps to institute such a service and should be willing to subsidize it if this proved necessary to get the freight rates sufficiently low to stimulate economic activity in the Great Slave Lake area. The matter has been gone into very carefully and discussed with officals of government agencies that would be concerned. It appears that a vessel to fulfill the requirements proposed in the Council meeting would cost at least $750,000 and possible substantially more. Even assuming that all of the freight to Yellowknife which now goes via Waterways would be transferred to the Mackenzie Highway and the ferry service, this ferry serv-

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ice would require an annual subsidy of around $100,000. Before the federal government can be persuaded to use money obtained from general Canadian taxes for such a purpose it will have to be convinced that such an expenditure is in the national interest. We, too, in our responsibilities for the Northwest Territories, would wish to be sure that expenditure on a ferry would be the best way in which such an amount of money could be spent in the interests of the Mackenzie valley as a whole. The proposal is one that will continue to receive attention as conditions in the Great Slave Lake region develop.

Development Roads

The second matter is the question of government assistance in the building of development roads. During the last session of Parliament there was considerable discussion of the problems of northern development, both in the House of Commons and in the Special Committee which studied the estimates of the Department of Northern Affairs and National Resources. During these discussions a number of members of Parliament urged the government to do more to further the development both of the Northwest Territories and of the Yukon Territory by the construction of roads into promising mining areas. We have been giving considerable study to this matter. It will be taken up with other departments of the government which are concerned, and I hope that I may be in a position to make a further statement at the next session of the Council.

Railroad to Pine Point

The third matter is the question of a railroad to Pine Point. The Minister of Northern Affairs made a statement on this subject in the House of Commons last May. After mentioning that at Pine Point on the south shore of Great Slave Lake there lies what we believe to be the greatest known ore body of lead and zinc, Mr. Lesage said:

"We hope that the Consolidated Mining and Smelting Company will soon see fit to have definite plans for the development and exploitation of this vast ore body. We hope that it will be possible to work out with them some kind of arrangement under which transportation facilities will be available to take out the ore. I have said, both outside the house and in the committee, that we hope it will be possible in days not too far off to have what is still the cheapest kind of transportation for distances of 300 or 400 miles or more, and that is a railway line from Grimshaw to Pine Point. We have been discussing, and still are discussing, the economic implications of such a project.

There is little that I can add to this statement except to emphasize that the matter is being studied most actively. The railway would benefit Canada's economic development substantially. In addition to permitting a very large and important lead-zinc mine to come into production at Pine Point, it would do a great deal to open up the entire District of Mackenzie, an area of 530,000 square miles covering land known to be rich in a wide variety of natural resources. However, the cost of this railway would be great—in the neighborhood of $50 million—and the traffic density, at least for some years to come, would be much lower than that required to make the line pay at current freight rates. Therefore, a large proportion of the capital cost, and perhaps the whole of it, would have to be borne by the federal government. Clearly, a decision of this magnitude cannot be made lightly and without thorough study and consideration.

As much information as possible is being gathered on all aspects of the question.

Mission Aims to Stimulate British-Canadian Trade

A THREE-MAN mission representing the Canadian mining industry sailed from New York Sept. 21 for a four-week visit to Great Britain, H. J. Fraser, president of the Canadian Metal Mining Association, announced.

The mission is at the invitation of the Dollar Exports Council of Great Britain with the object of stimulating a greater flow of two-way trade between Great Britain and Canada, Mr. Fraser said.

Members of the mission are: Marc Boyer, Ottawa, deputy minister, department of mines and technical surveys, who has been granted two months leave of absence for this purpose; T. E. Little, Noranda, Que., general manager, Waite Amulet Mines Limited; and V. C. Wansbrough, Toronto, vice-president and managing director of the Canadian Metal Mining Association.

"If British manufacturers were more aware of the growing potential of the Canadian mining industry as a market for machinery and supplies of British manufacture and origin, Great Britain could acquire more dollars and thereby be in a position to purchase more Canadian products", the CMMA president declared. "Considerable alarm has been expressed recently in the United Kingdom at the declining volume of British-Canadian trade."

While in many respects Canadian mining companies are very well served by established Canadian supply houses, a large volume of machinery and equipment has still to be imported, Mr. Fraser pointed out. He hoped that without disturbing established Canadian sources of supply, British manufacturers will be able to furnish a larger proportion of imported requirements than has proved practicable in recent years.

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New Brunswick Tungsten Mines Now in Production

First of New Brunswick's current mining boom operations to go into regular production, Burnt Hill Tungsten Mines' wolframite tungsten mine, 65 miles north of Fredericton, is setting its sights on crushing a daily average of 150 tons of ore.

The 2½-year-old operation left the pre-production for the production stage with the shipment of 13 tons of concentrate averaging a premium grade of 70.8% tungstic oxide, WO_3 as against a required commercial minimum of 65% WO_3, which brought a price of $3,360 per short ton.

Meanwhile Mine Manager F. L. Smith has stepped-up the company's operations to three 8-hour shifts in both the mill and underground, is now employing close to 45 in the mine and concentrator, and increased the operating expenses from around $250,000 to between $350,000 and $400,000 annually.

He has added an assayer to the staff, is lining up equipment for a laboratory, and plans on acquiring sufficient mine and mill workers for a swing-shift to operate on a 7-day week basis.

Present company plans also call for installing additional equipment to raise the mill's capacity from 150 to 300 tons.

Plastic Industries (Alberta) Ltd. Advanced Rapidly in First Year

RAPID progress marks the first anniversary of Plastic Industries (Alberta) Ltd., manufacturers of Polco Pure Polythene Pipe. The company was founded by J. R. Soifer, vice-president and manager, who is a member of the Professional Society of Plastic Engineers, and in one year has advanced to the stage where it has branched out into three separate departments, with a fourth planned for the near future.

Using the most up-to-date electronic equipment, the main Extrusion Department manufactures the company's first and major product, cold water installation polythene pipe. The high patent gloss bore interior finish of the Polco pipe results in a smoother faster flow of liquids. Because of its extreme light weight and the fact that it can be shipped in coils, it is used extensively in industry, mines, agriculture and construction, and even by the weekend handyman. Polco has also proved popular for both indoor and outdoor rinks.

Polco is now playing an important part in the Natural Gas Industry. Forty-six companies are now or soon will be installing plastic pipe for regular or test use.

Another product soon to be manufactured by Plastic Industries (Alberta) Ltd., cellulose acetate butyrate, is arousing great interest in the Oil Industry. This has been used most successfully to combat corrosion caused by salt water, crude and sour crude oil, natural gas and certain types of earth.

Plans are also under way to produce the newest plastic innovation—rigid hot water polythene. Rigid polythene with its unusual combination of properties and price, will undoubtedly replace many metals, and also be manufactured into items hitherto considered unsuitable for plastics.

J. R. SOIFER

It is anticipated Plastic Industries (Alberta) Ltd., will be one of the first companies in Canada to produce rigid hot water polythene commercially. Mr. Soifer is presently in the United States purchasing electronic equipment for this purpose.

The Extrusion Department produces large quantities of pipe, tubing, cable cover, film, and shapes and forms for glazing window frames and overhead doors.

Cutting, forming and fabrication of Acrylic Plexiglass and Perspex are handled by the Fabrication Department. Here aircraft windows, boat windows, vacuum bottles and similar items are manufactured.

The Injection Molding Department produces individual articles such as lawn sprinkler heads, toys, plates, dishes, bottle and can caps, and a host of other household utensils.

A new department will shortly be formed to handle liquid, sprayable plastics that turn into film-like solids on contact with air. Sprayed-on plastics have already proved ideal for storage purposes. One outstanding example of their usefulness is the U.S. "Operation Mothball" that still protects American fighting equipment from deterioration. The same techniques will also be employed by Plastic Industries to manufacture moisture-proof, scuff-proof armchairs of modernistic design.

Sprayed-on plastics have made important advances in the building trade, too. They have been used, with great success, to resurface roof and walls; providing a protective coating that actually expands and contracts with the movement of the building. Sprayed-on plastic coatings are resistant to mildew, moisture, grease and scuffing. They are washable, non-combustible, and will caulk all cracks and openings.

The company's operations have attracted inquiries from London, Paris, Germany and even Australia.

BULLETIN DESCRIBES INCO NICKEL ALLOY HELICAL SPRINGS

Up-to-date information on Inco Nickel alloy helical springs is contained in International Nickel's Technical Bulletin T-35.

The 35-page booklet contains comprehensive data and numerous charts on production of wire for springs. Additional information is included on alloys used in springs; corrosion resistance; design factors; extension springs; flat springs; manufacture of springs; mechanical properties of spring wire; physical constants; production of wire for springs; properties of springs; Ni-Span-C; Permanickel; thermal treatments and the Wahl curvature correction factor.

An extensive bibliography and list of available bulletins are included. Copies of Bulletin T-35 may be obtained from The International Nickel Company of Canada, Limited, 25 King St. W., Toronto 1, Ont.

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MINERAL LAW TO DATE

By RICHARDSON, RICHARDSON, McLACHLAN & NORTON,

Barristers and Attorney-at-Law, Winnipeg, Manitoba

PROCEEDINGS ON CAVEAT RESPECTING ALLEGED MINERAL RIGHTS:

Imperial Oil Limited vs. Conroy and Berthiaume (Judicial Trustee of Gratrix Estate) (1954) 12 W.W.R. (NS) 569 (Alta.).

Imperial Oil Company Limited, hereinafter referred to as Imperial, brought this action seeking a declaration of the court that the petroleum and natural gas lease covering a certain quarter section of land in Alberta and which lease was granted by the defendant Conroy to Imperial, stipulated a valid and subsisting contract as between not only the Oil Company on the one hand and the defendant Conroy but also as against the defendant Berthiaume. In 1929 the land in question was transferred to Berthiaume by Conroy but the mines and minerals were excepted or reserved to Conroy and consequently the certificate of title issued to Berthiaume was for what might be termed as surface rights only. In 1948 Conroy gave the lease in question to Imperial which immediately registered a caveat based thereon. In 1950 in an action in the courts by Berthiaume against Conroy and in which Imperial was not a party the judge hearing the matter declared that the mines and minerals belonged not to Conroy but to Berthiaume and ordered the transfer to Berthiaume from Conroy to be rectified in the Land Titles Office. This judgment was not appealed. The Registrar of the land titles caused the title to the mines and minerals to be added to Berthiaume's title. Imperial refused to withdraw the caveat and endeavored to make payment of the annual rental. Acceptance of payment was refused by Berthiaume who notified Imperial to take proceedings to maintain its caveat. Imperial then brought this present action against both Conroy and Berthiaume. Conroy did not defend.

Berthiaume contended that the earlier judgment namely in 1950 was retrospective and therefore when Conroy gave a lease to Imperial in 1948 it was not a valid lease; that the caveat filed by Imperial was not a "registration of title" within the meaning of the Land Titles Act and that only such a registration furnishes a protection to those dealing on the faith of the register with a registered owner; and that, in the alternative the lease had lapsed for non payment of the delay rental.

It was held that none of these contentions by Berthiaume were maintainable; the reasons for judgment in the action brought by Berthiaume against Conroy dealt only with the rights of the parties to that action. They made no reference, declaration or finding as to Imperial's lease or Imperial's rights as lessee. Imperial contracting as lessee with Conroy as lessor did so in good faith, for valuable consideration and relying on the faith of the Land Titles register or record. It was not necessary to go beyond Conroy's title and to investigate its history. If there were wrongful or fraudulent acts by Conroy, Imperial was completely ignorant of them. Therefore and by virtue of the Land Titles Act it acquired a better title as lessee to the leasehold estate granted to it in 1948 than the tainted title of the lessor.

The court said it would be a startling result to hold that because Imperial had chosen to protect its leasehold estate from Conroy by registering a caveat rather than by registering the lease itself (in which case the registrar would in due course have issued to Imperial a certificate of title) that it had thereby deprived itself of the protection otherwise afforded by the Land Titles Act to anyone who, as Imperial did, deals and acts in good faith, for valuable consideration and in reliance upon the title as it appeared on the Land Titles records.

As to the question of non payment of rental, Berthiaume could not take advantage of her own refusal to name a new depository for the delayed rental and her rejection of the cheque sent her by Imperial in payment thereof, or be heard to complain of Imperial's acts following on her refusal and rejection.

INCO BOOKLET TELLS OF NIONEL, NEWEST NICKEL ALLOY

A new booklet, "Introduction to Nionel," which summarizes most of the information on Inco's newest nickel alloy is now available from The International Nickel Company of Canada, Limited, 25 King St. W., Toronto 1, Ont.

The booklet outlines the chemical and physical properties of the Nionel and suggests a number of promising applications.

Among the applications indicated for the alloy, which has the specific ability to withstand certain hot acids and oxidizing chemicals, are the handling of sulphuric acid solutions, sulphurous acid, phosphoric acid, nitric acid, organic acids, sea water and chlorides.

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JEFFREY APPOINTS NEW LAKEHEAD DISTRIBUTOR

Jeffrey Manufacturing Company Limited of Montreal, manufacturer of chains, conveying and material handling equipment, crushers and pulverizers, electric vibrating and mining machinery, has announced the appointment of M. F. Mills Supply Limited, of Fort William-Port Arthur, as distributor in the Lakehead district of Western Canada.

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Through Jeffrey, M. F. Mills Supply Limited will also distribute Diamond chains and sprockets as well as Foote Bros. enclosed gear speed reduction equipment in the Lakehead area.

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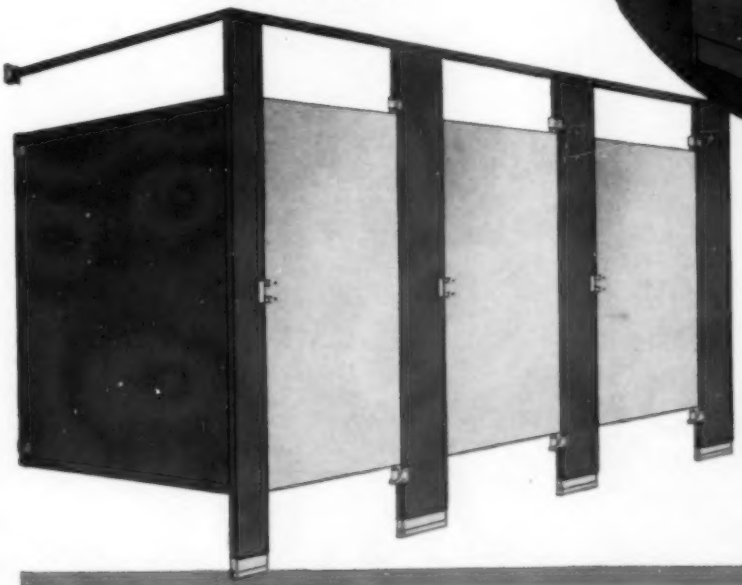

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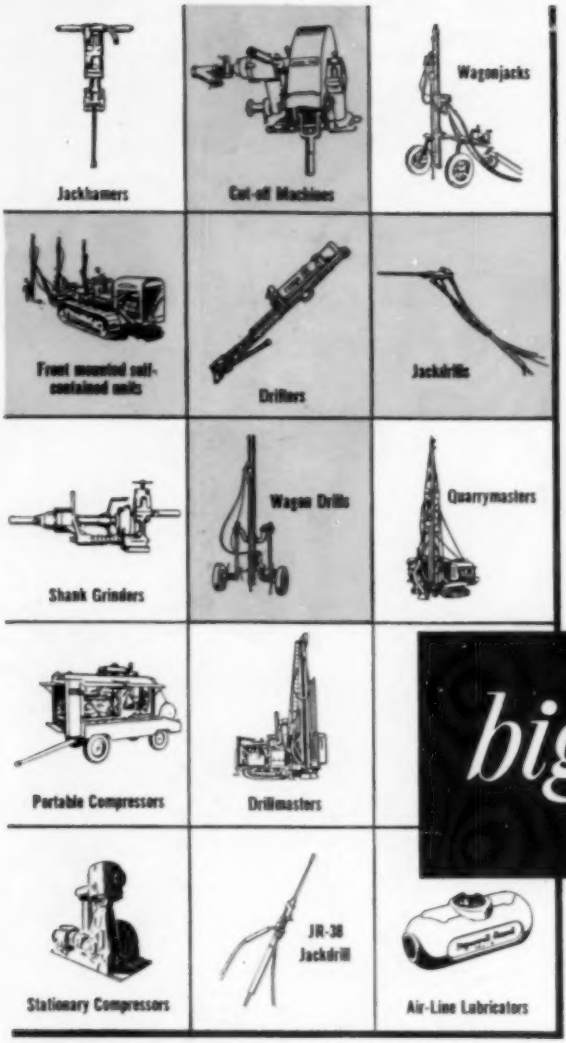

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